9th annual southern california economic summit

COUNTY ECONOMIC REPORT

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COUNTY ECONOMIC REPORTS

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Section 1 – Executive Summary

Commissioned by the Southern California Association of Governments (SCAG), the 2018 Orange County Economic Update provides a comprehensive overview of Orange County's economic, demographic, housing, and educational landscapes alongside their short- and long-term forecasts. In doing so, it will prepare local elected officials, city managers, economic development professionals, employers, and educators to address the current and future trends serving that will impact the region, giving them the information they need to leverage the county's strengths and mitigate potential challenges. This report will be released at the Ninth Annual Southern California Economic Summit, which will be held on December 6, 2018 and is co-hosted by SCAG and the Southern California Leadership Council.

This comprehensive overview will include measures and projections of demographics, employment, educational attainment, earnings, housing, and poverty within the following sections:

- Current Economic Conditions
- Key Existing and Emerging Industries
- Innovation in Orange County
- Occupational Employment and Salary Growth
- Income and Poverty Statistics
- Educational Attainment Demographics
- Housing Market and Construction Activity

The 2018 Orange County SCAG Update highlights a variety of metrics at the local, regional, state, and national level to provide regional stakeholders with up-to-date information enabling them to better strategize and implement actionable policies that can maximize economic growth and minimize potential negative impacts which may manifest. Orange County has undergone a demographic transformation over the past several decades marked by an aging population and fewer younger residents. The region's housing market, after taking a significant hit during the Great Recession, has since rebounded as both traditional homes and rentals have hit record high prices. The labor market has also seen dramatic changes, not only a decade-low unemployment rate, but technological advancements that continue to disrupt traditional industries and processes, resulting in both increasing efficiency and a transformation of workforce skills.

As a variety of factors – from new technologies and business models to long-term demographic shifts – continue to transform local, regional, and national economies, Orange County remains an economic engine for Southern California. Armed with this report, local stakeholders and policymakers have the necessary information to create effective, actionable strategies aimed at

reducing potential negative impacts while leveraging strengths to amplify positive economic impacts. Some standout trends include an aging population that will place additional burden on local health care systems, new and emerging technological improvements disrupting established industries requiring a new assessment of workforce skills and abilities, and a chronic shortage of affordable workforce housing that drives up prices and could begin to drain the county's talent pool. Local stakeholders and policymakers should especially prioritize attracting and retaining the young workers that will be needed to support the county's rapidly aging population. Increasing the housing supply should also be a priority. A recent Orange Council Business Council report, *Inside Orange County's Retail E-volution*, proposes one potential solution to this problem: the conversion of underperforming retail space into affordable housing units.

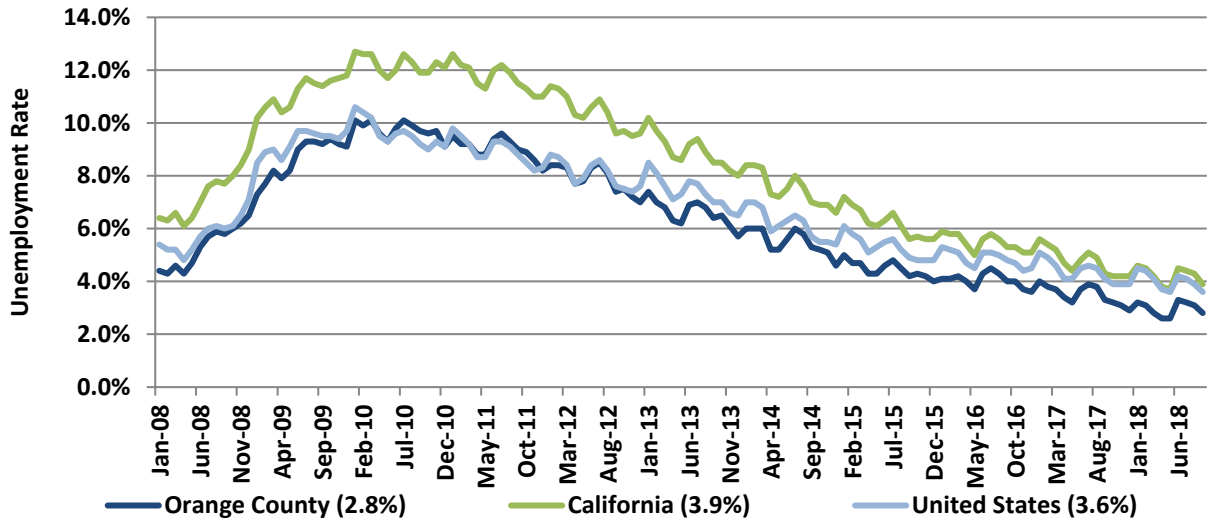
Local policymakers and stakeholders will also need to focus on preparing current and future workers for success in tomorrow's labor market, which will require very different skill sets—and create very different jobs—than that of yesterday or today.

While Orange County has seen strong economic growth and activity in recent years, political and economic uncertainty may result in unforeseen consequences for both local and regional economies. Therefore, local elected officials and stakeholders will need to strategize on how best to leverage regional strengths while reinforcing weaknesses to better shelter the region from unpredictable events, such as the Great Recession. As such, this report aims to educate local leaders on regional strengths, weaknesses, opportunities, and threats currently impacting the region and which could impact the region over the next few years. Orange County has long been an economic powerhouse for Southern California and preserving this role will ensure a healthy labor market, innovative spirit, growing industry clusters, and positive economic environment where residents at all levels can enjoy an increasing quality of life.

Section 2 – Current Economic Conditions

Orange County's labor market remains strong, with its September 2018 unemployment of 2.8% well below the state and national rates of 3.9% and 3.6%, respectively. The county's unemployment rate dropped to a near-record low of 2.6% in April and May 2018 before increasingly slightly to 3.3% in June, a seasonal shift also seen at the state and national level that reflects an influx of college graduates entering the labor market. Exhibit 2.1 shows county, state, and national unemployment rates since January 2008, illustrating the effects of the Great Recession and the region's subsequent recovery.

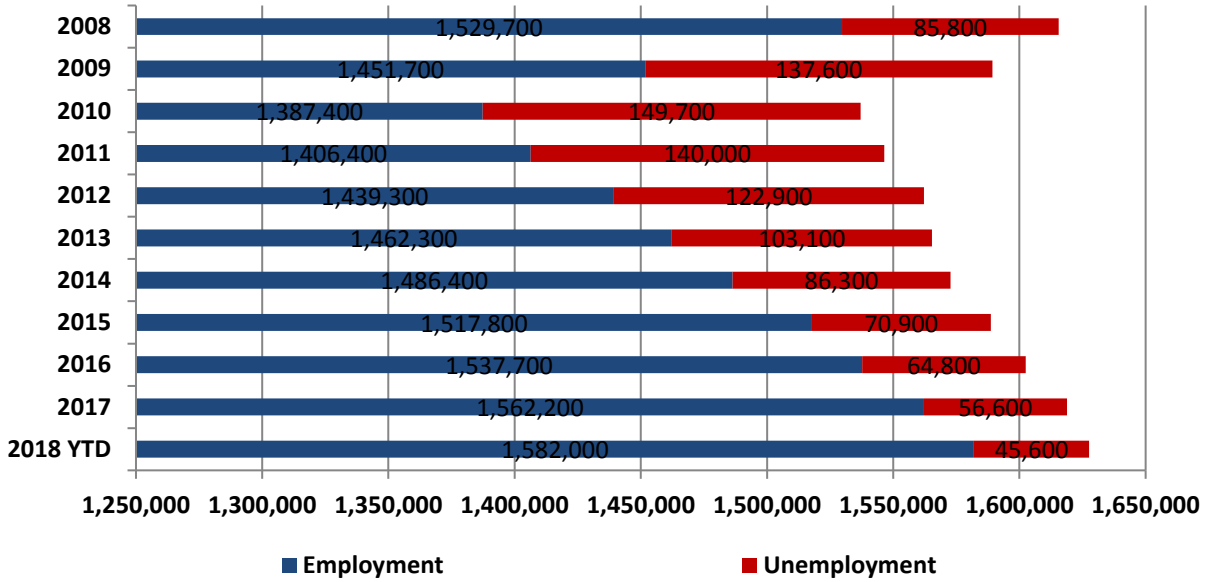
Exhibit 2.1 Unemployment Rates (Jan. 2008 – Sept. 2018)



Source: California Employment Development Department

Alongside this near-record low unemployment rate, Orange County's labor force has seen tremendous improvements since 2010 when the number of unemployed individuals totaled 149,700. In September 2018, a total of 1,582,000 individuals were employed in the county and 45,600 individuals were unemployed, representing an increase of 194,600 employed individuals and a decrease of 104,100 unemployed individuals since 2010.

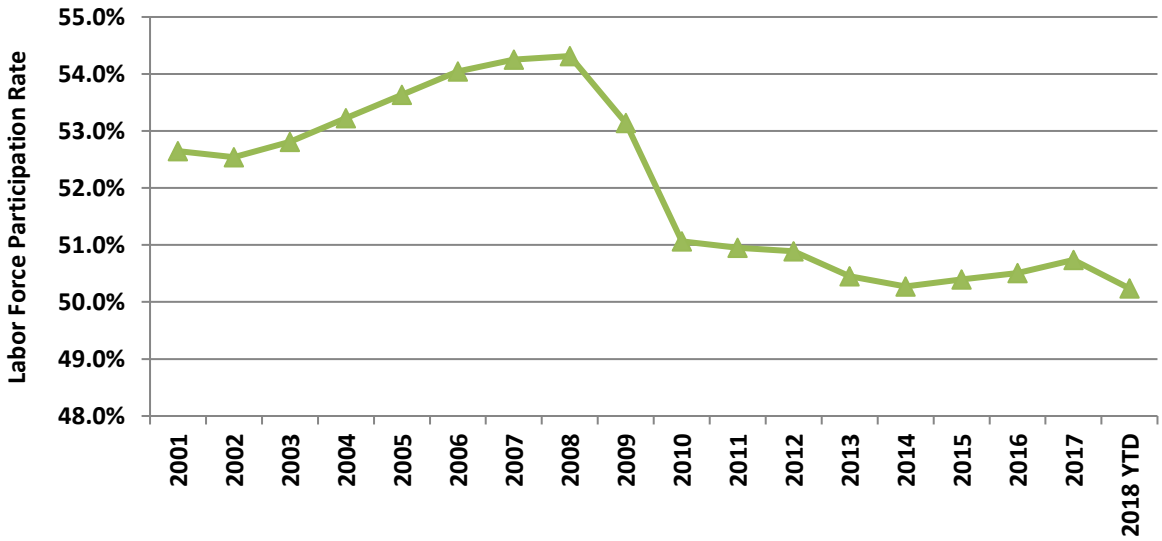
Exhibit 2.2 Orange County Labor Force Characteristics (2008-2018)



Source: California Employment Development Department

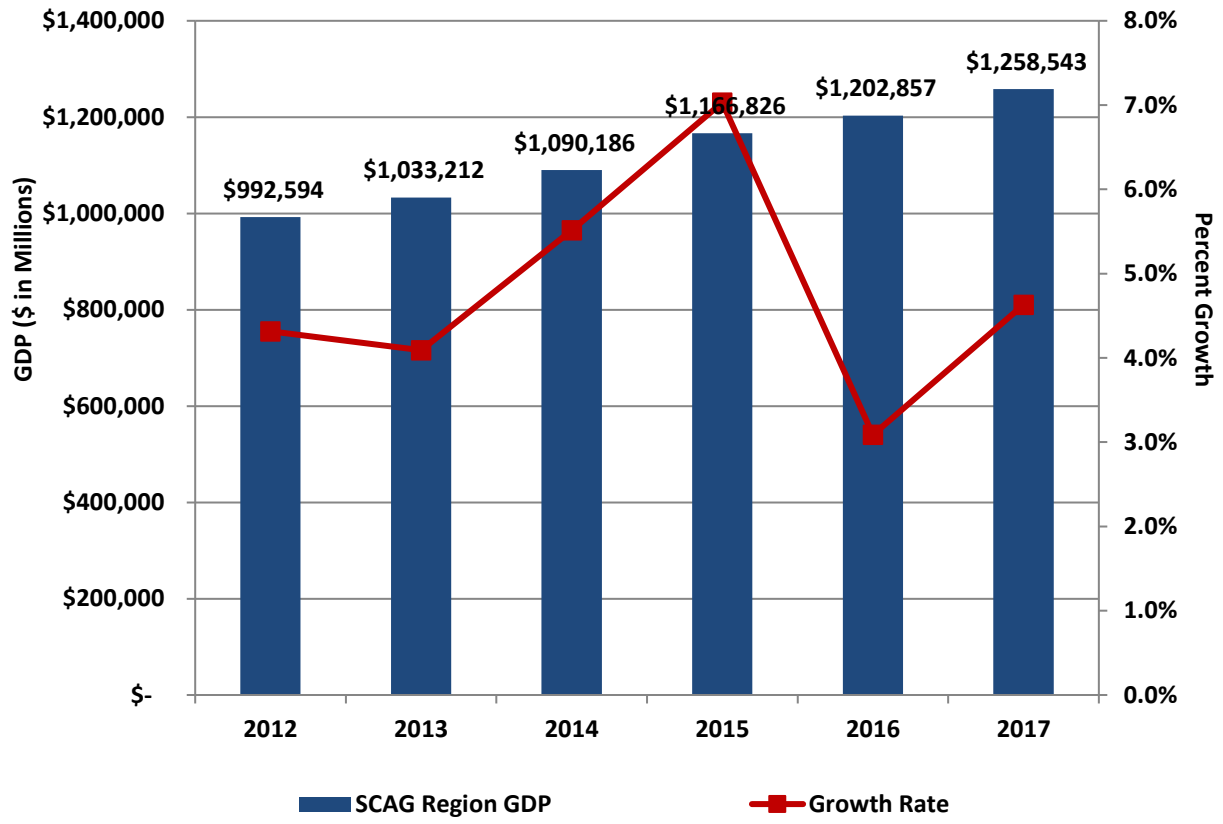
As of September 2018, Orange County had a labor force participation rate of 50.5%, a 0.2% decrease from 2017's average. Orange County's labor force participation rate, which reached a high of 54.3% in 2008, has yet to fully recover from Great Recession-related declines due to the county's demographic evolution—a shrinking working age population and a correspondingly higher number of retirees—which decreases labor force participation. The county's high and rising cost of living continues to exacerbate this issue by pricing many workers and young families out of the area.

Exhibit 2.3 Orange County Labor Force Participation Rate (2001 – 2018 YTD)



Source: California Employment Development Department

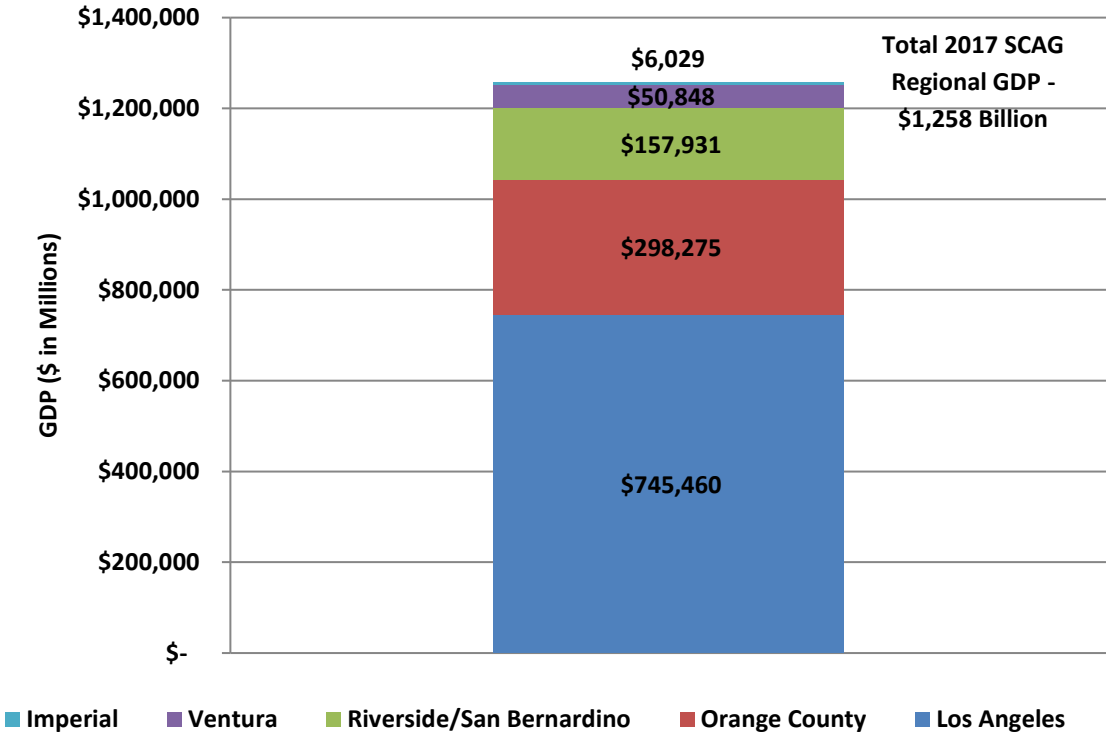
Exhibit 2.4 SCAG Region GDP Growth (2012 - 2017)



Source: OCBC Analysis of U.S. Department of Commerce, Bureau of Economic Analysis Data

The chart above (Exhibit 2.4) highlights Southern California's economic activity and growth. Overall, the SCAG region, which includes Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties, saw its gross domestic product (GDP) grow from $992 billion in 2012 to $1,258 billion in 2017. This makes the SCAG region more productive than entire countries such as Mexico, Indonesia, and Turkey. Overall, Orange County accounted for 23.7% of the region's GDP or $298 billion in 2017. While Orange County has seen its labor force participation continually shrink in recent years, its GDP has continually increased, highlighting the region's continued role in Southern California's economic engine despite a shrinking labor force participation rate.

Exhibit 2.5 2017 SCAG Regional GDP ($ in Billions)

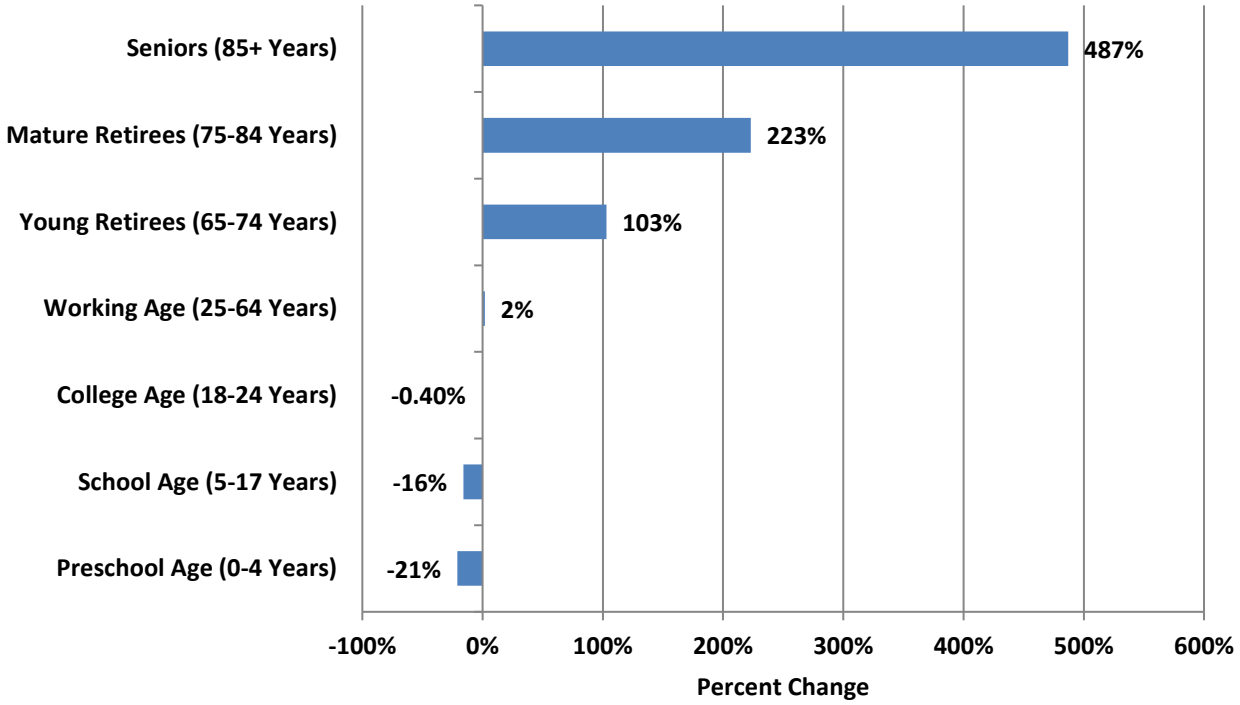


Source: OCBC Analysis of U.S. Department of Commerce, Bureau of Economic Analysis Data,

Orange County's dramatic demographic shifts will have significant, long-term consequences. As noted in Exhibit 2.6, the California Department of Finance (DOF) estimates that Orange County's school age, college age, and working age populations will shrink by 21%, 16%, and 0.4%, respectively, between 2010 and 2060. This loss of younger individuals and families will have consequences, most notably a shrinking labor force that will make it more difficult for local employers to fill open positions. The county's deep talent pool, a long-standing competitive advantage that allows it to attract new and established businesses, could be drained by these developments, which would have a significantly negative effect on its overall economic climate unless proactively addressed by county stakeholders and policymakers.

Older groups, on the other hand, are expected to grow rapidly. The number of young retirees, mature retirees, and seniors in Orange County will increase by 103%, 223%, and 487%, respectively, over the same time period. These age cohorts' expansion will increase pressure on health care services such as home health aides and other senior services. This added pressure, combined with fewer and fewer potential workers, means that the county's health care industry may not be able to be able to support the increasing number of older residents.

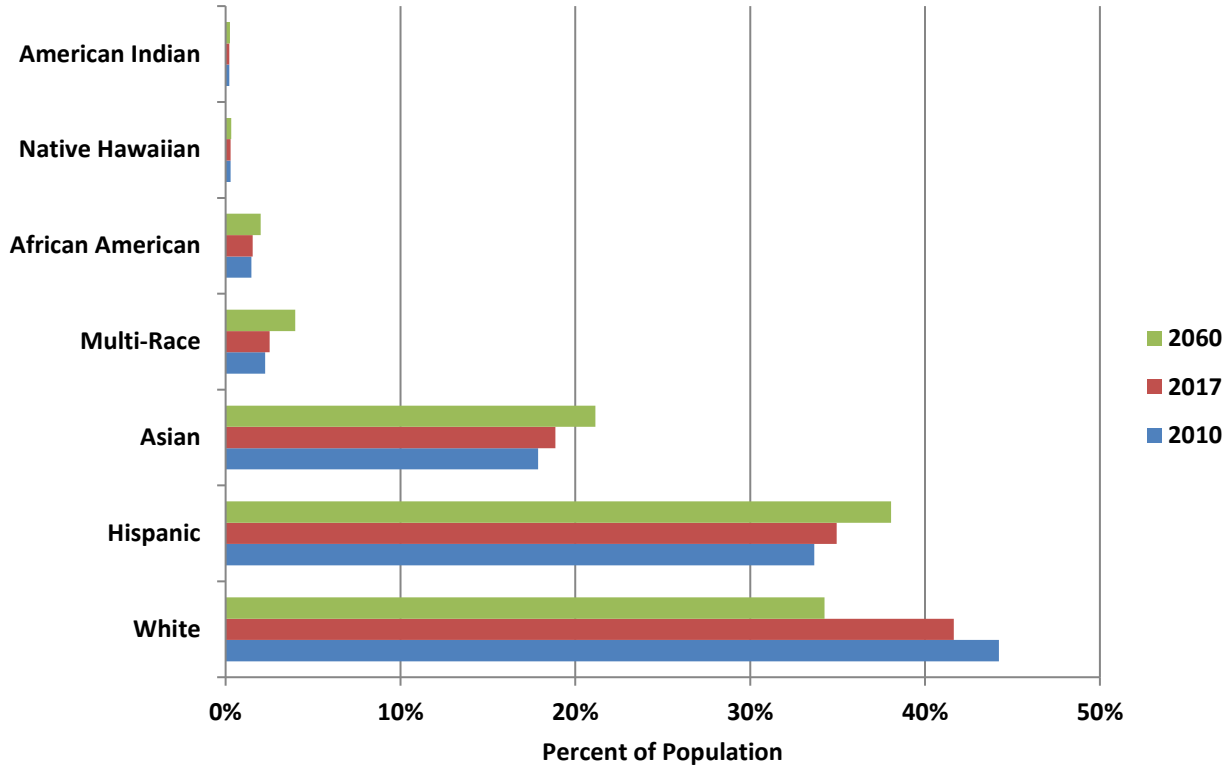
Exhibit 2.6 Orange County Projected Population Change by Age Group (2010-2060)



Source: California Department of Finance, Demographic Research Unit

Alongside shifts in Orange County age groups, the region is also seeing increasing levels of ethnic diversity, a trend that the DOF expects to continue into 2060. Exhibit 2.7 provides past, current, and projected measures of Orange County's ethnic composition, illustrating how diverse Orange County will become over the next few decades. Orange County has already experienced significant diversification since the 1980s, which has provided significant economic benefits in the form of a diverse and well-educated workforce with global connections. While this diversity of workers has benefitted regional employers, it is important that training programs be put in place to better support and train these individuals. These programs should include programs oriented to both children and adults in order to build a strong foundation for both career and educational success.

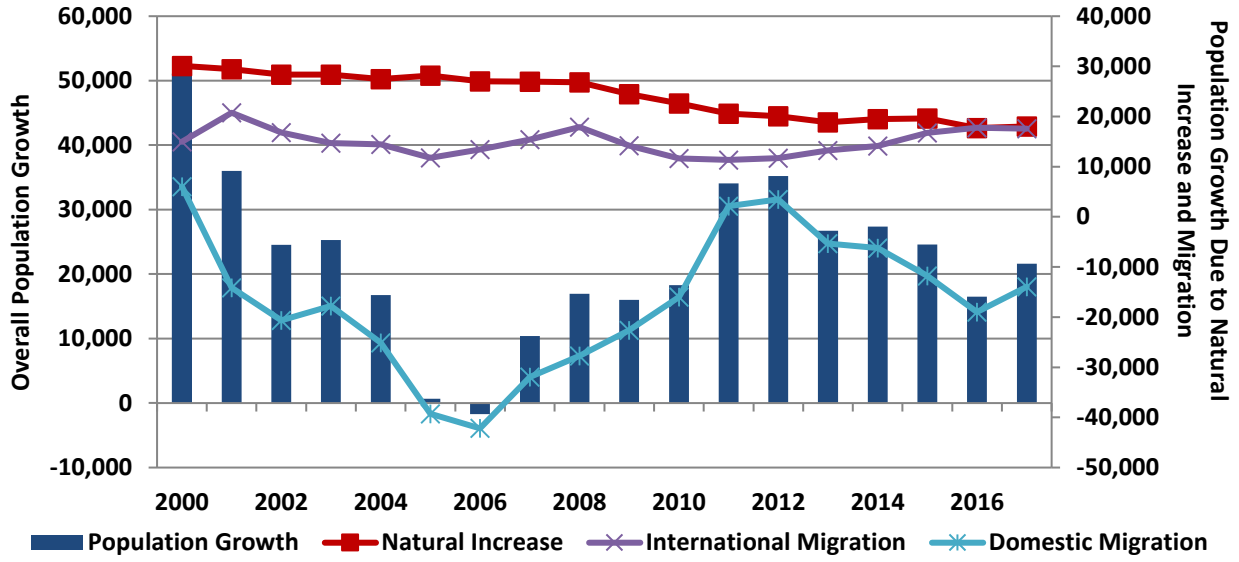
Exhibit 2.7 Orange County Projected Population Change (2010-2060)



Source: California Department of Finance, Demographic Research Unit

The year 2000 marked a turning point for Orange County's population growth. Prior to 2000, the main source of population growth stemmed from migration into the region. After the turn of the millennium, however, migration decreased and natural increase (births minus deaths) became the primary source of population growth. Overall, natural increase has added 433,944 individuals to the region since 2000 while net migration, which includes both domestic and international migration, decreased the overall population by 33,602. While domestic migration continues to limit overall population growth, international migration remains as the largest source of population increase. Domestic migration first turned negative in 2001 and persisted until 2010 as rising home prices and the Great Recession prevented many individuals from moving into the region. In 2011 and 2012, domestic migration turned positive as lower housing prices and a recovering economy increased overall affordability. This trend, however, was short-lived as domestic migration turned negative again in 2013 with 5,368 individuals leaving the region, increasing to 18,977 individuals leaving by 2016. While 2017 saw 13,972 individuals leave the region, this is a large drop from the previous year and suggests that a robust labor market and increasing wage levels are a major factor in retaining more residents in the county as the tradeoff between good-paying occupations and housing costs is not as acute as it was in previous years.

Exhibit 2.8 Orange County Population Growth (2000-2017)



Source: California Department of Finance, Demographic Research Unit

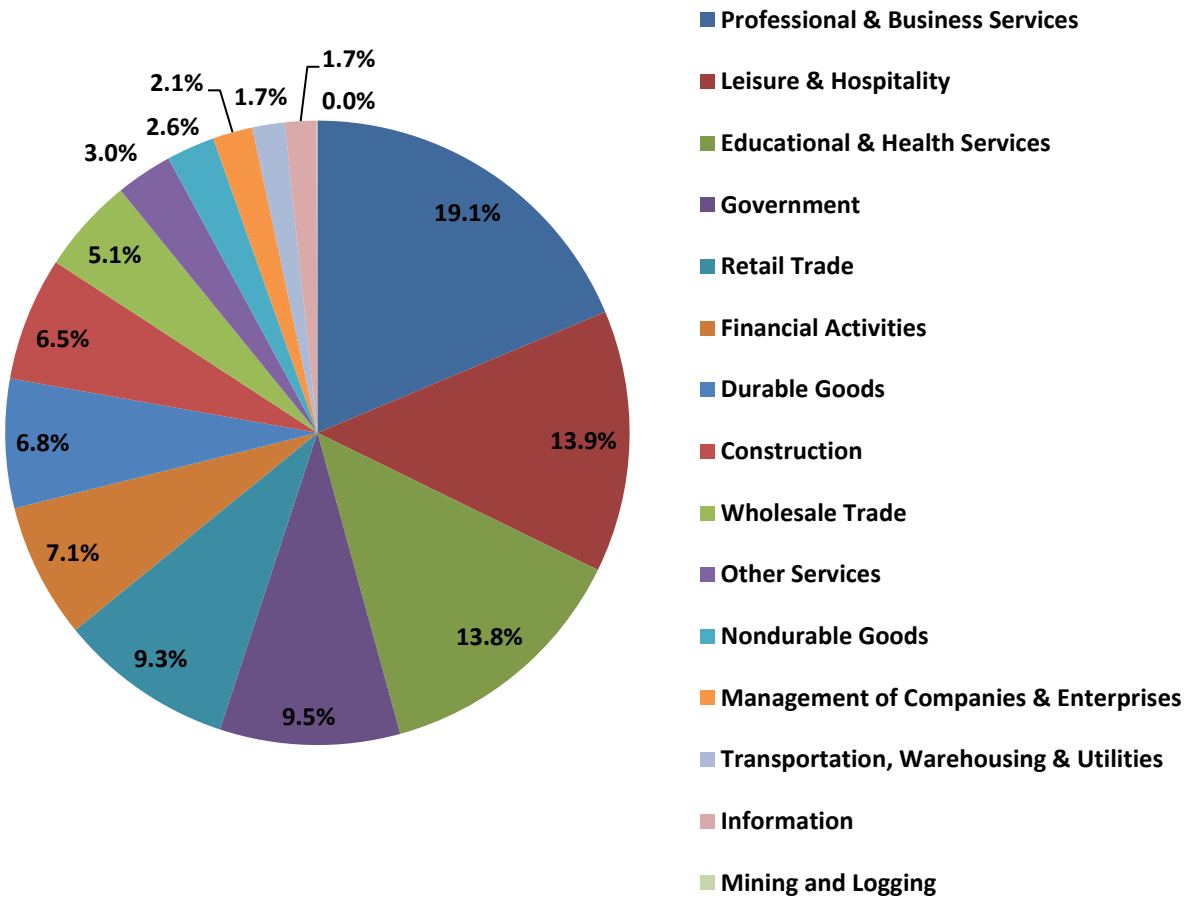
While these demographic trends are concerning, Orange County's continued economic growth and expansion highlights its resiliency even in the face of potentially negative trends. Demographic trends are not the only changes with the potential to reshape Orange County's future. Technological developments, for example, continue to have significant impacts on the labor market, influencing how people work, interact, and consume products and services. The rise of e-commerce has transformed the retail market while big data, the internet of things (IoT), and automation have impacted business processes and relationships. County stakeholders and policymakers must create strategies to leverage the disruptive technologies, which will continue to transform the economy and labor market.

In order to properly leverage their potential benefits and mitigate potential risks, local stakeholders and policymakers must craft and support an environment which encourages regional collaboration between innovators, employers, academia, and workforce development organizations. This will allow rapid and effective implementation of new technologies in the workplace, supported by a qualified and well-educated workforce.

Section 3 - Key Existing and Emerging Industries

According to the most recent data from the California Employment Development Department (EDD), Orange County's largest industries in terms of employment (Exhibit 3.1) include Professional & Business Services, Leisure & Hospitality, and Educational & Health Services. Educational & Health Services saw the largest year-over-year percentage growth, increasing employment by 3.7%, followed by Leisure and Hospitality at 3.0%, and Management of Companies and Enterprises at 2.1%.

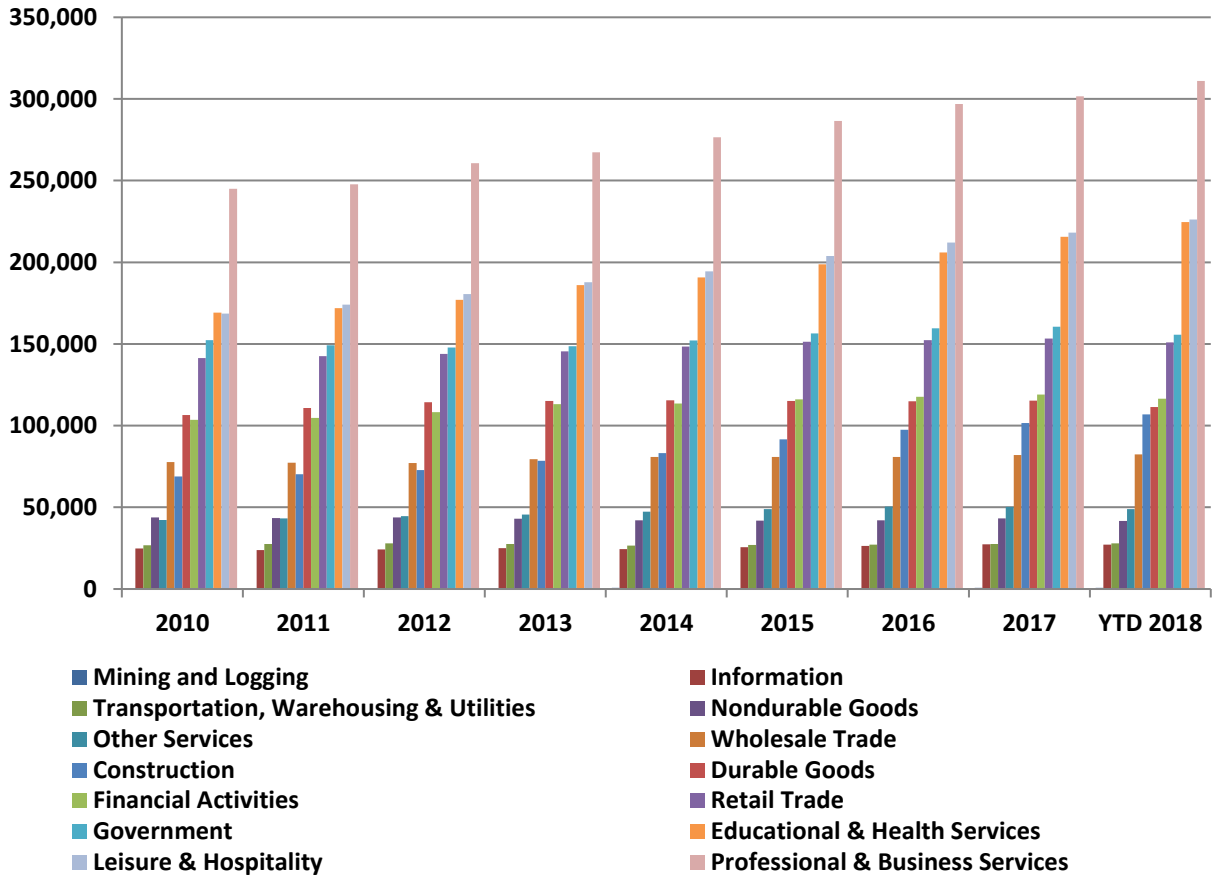
Exhibit 3.1 Orange County Industry Employment Breakdown (September 2018)



Source: California Employment Development Department

Exhibit 3.2 provides a six-year overview of employment trends by industry in Orange County, showcasing changes in the county's key industries. The chart's employment totals are current as of September 2018.

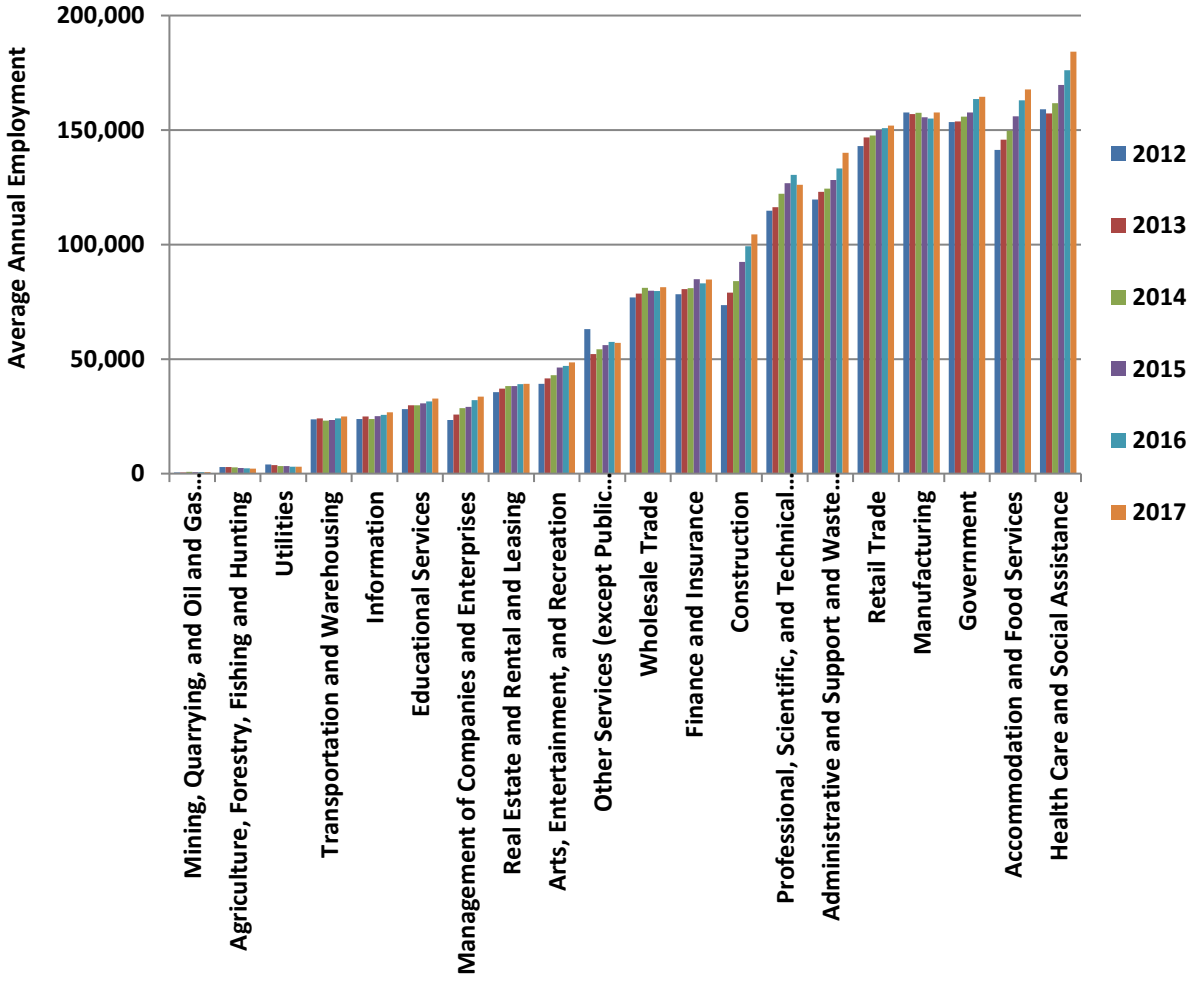
Exhibit 3.2 Orange County Annual Industry Trends (2010-2018 YTD)



Source: California Employment Development Department

Data provided by Economic Modeling Specialists Intl. (Emsi), an industry leading provider of labor market data and economic analysis that aggregates and updates data from dozens of government sources including the U.S. Bureau of Labor Statistics (BLS), provides a snapshot of Orange County industry employment with slightly different industry definitions. Overall industry employment in Orange County has had an annual growth rate of 2.2% since 2012. The County's total industry employment was 1,631,596 in 2017, 2.1% higher than in 2016. The Health Care and Social Assistance sector had the highest overall employment in 2017 (184,295), followed by Accommodation and Food Services (167,679), and Government (164,535). The Administration and Support and Waste Remediation, Construction, and Management of Companies and Enterprises sectors also saw significant percentage growth.

Exhibit 3.3 Orange County Average Industry Employment (2012-2017)

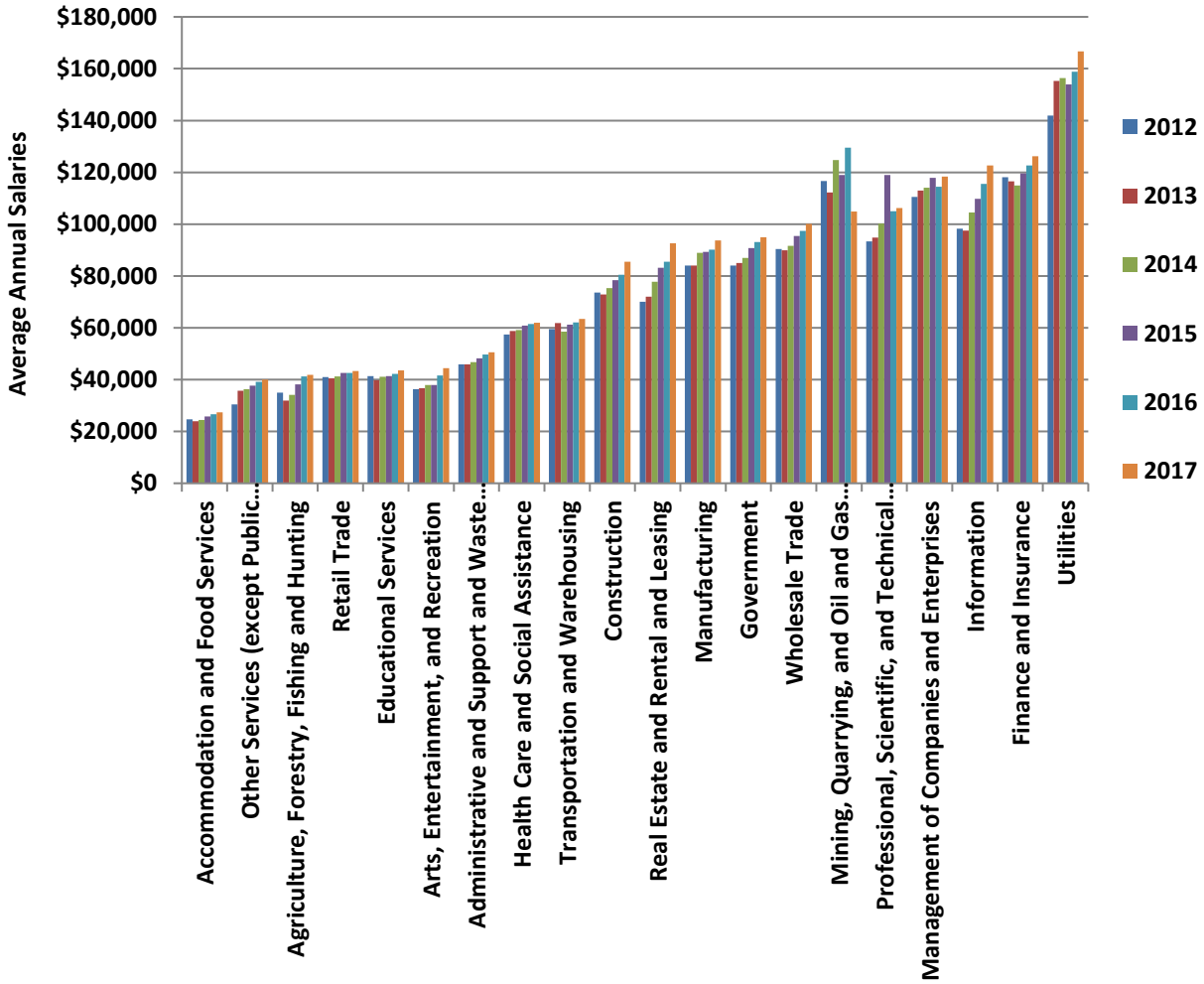


Source: Emsi

Orange County had an overall weighted average industry salary of $73,697, an increase of 2.6% or $1,864 over the previous year. Orange County's wages are increasing at the top end as the highest paying industries in 2017 were Utilities, with an annual average wage of $166,644 (likely well-compensated executive positions), Finance and Insurance, with an annual average wage of $126,212, and Information, with an annual average wage of $122,690. According to Emsi, the industry sub-sectors driving the high wages within the Utilities sector included Fossil Fuel Electric Power Generation with annual average wages of $230,122, Nuclear Electric Power Generation with wages of $171,385, and Other Electric Power Generation, which provided wages of $155,420. The Real Estate and Rental and Leasing industry saw the largest year-over-year

percentage growth (8.3%), followed by Arts, Entertainment and Recreation (67.0%), Construction (6.2%), and Information (also 6.2%).

Exhibit 3.4 Orange County Average Industry Salaries (2012-2017)



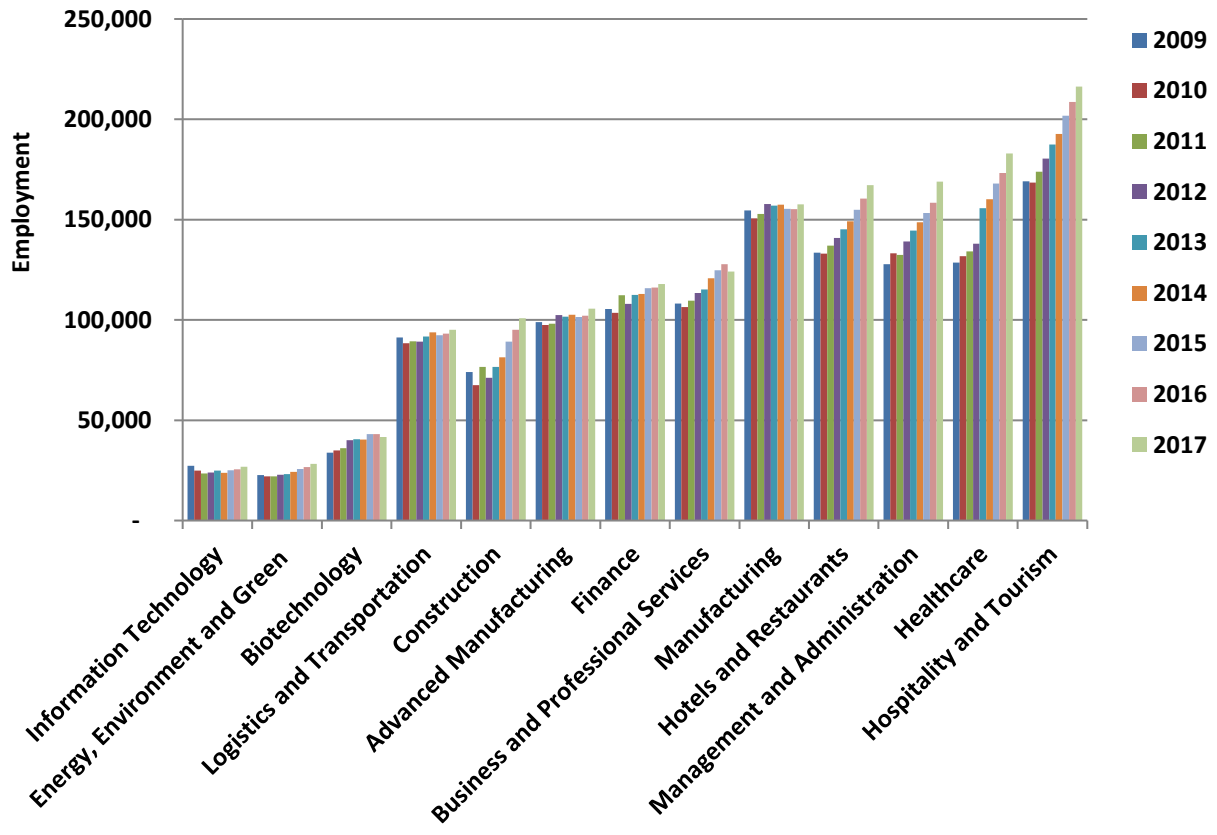
Source: Emsi

Alongside traditional industries, Orange County is also home to industry clusters, which are formed by the concentration of related businesses and lead to innovation, deeper talent pools, increased productivity, and a major impact on the surrounding economy through high multiplier effects. Entertainment in Los Angeles, wine in Napa Valley, and technology in Silicon Valley are examples of thriving industry clusters in California, exemplifying how the formation of these clusters promotes collaboration and healthy competition, attracts new businesses, supports connections between business, government and academia, and builds a regional reputation as a center of excellence. These benefits mean that supporting the development of industry clusters

should be a priority for local and regional stakeholders and policymakers. By creating multiple nearly self-sufficient business environments, Orange County provides residents with a consistent supply of well-paying, innovative, sustainable employment opportunities.

Orange County's largest industry clusters in 2017 included Hospitality & Tourism, Health Care, and Management & Administration. These clusters also experienced the largest increase in jobs over the past year, with Management & Administration adding 10,578 jobs followed by Health Care, which added 9,650 jobs, and Hospitality & Tourism, which added 7,666 jobs. Overall, all of Orange County's industry clusters saw employment growth with the exception of Business & Professional Services, which shrank by 3,676 jobs, and Biotechnology, which shrunk by 1,515 jobs. Overall, Orange County industry clusters grew by 38,919 jobs or by 2.6% between 2016 and 2017.

Exhibit 3.5 Orange County Annual Industry Cluster Employment Trends (2009-2017)



Source: OCBC Analysis of California Employment Development Department, Quarterly Census of Employment and Wages

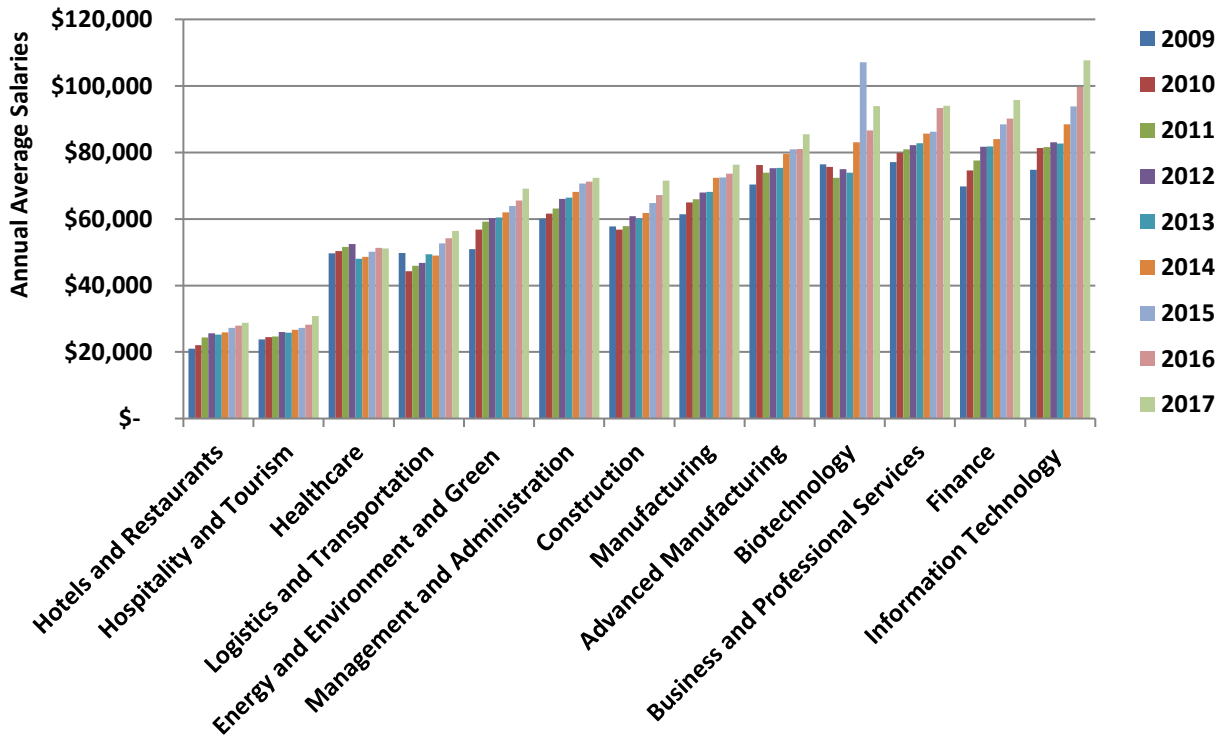
Industry cluster wage growth surpassed overall employment growth from 2016 to 2017 with average industry cluster wages increasing from $68,467 to $71,786, an increase of 4.8%. Industry

clusters paying the highest wages included Information Technology ($107,705), Finance ($95,751), and Business & Professional Services ($94,003). The largest absolute wage increase occurred in Information Technology where wages increased by $8,021, followed by Biotechnology (wage increase of $7,285) and Finance ($5,069). On a percentage basis, the largest increases occurred in:

- Hospitality & Tourism (9.1 percent);
- Biotechnology (8.4 percent); and
- Information Technology (8.0 percent).

Only one Orange County industry cluster, Health Care, saw a wage decrease; its wages fell by $182 or 0.4%. Industry cluster wage growth is a welcome development in Orange County where housing costs and the overall cost of living continue to rise.

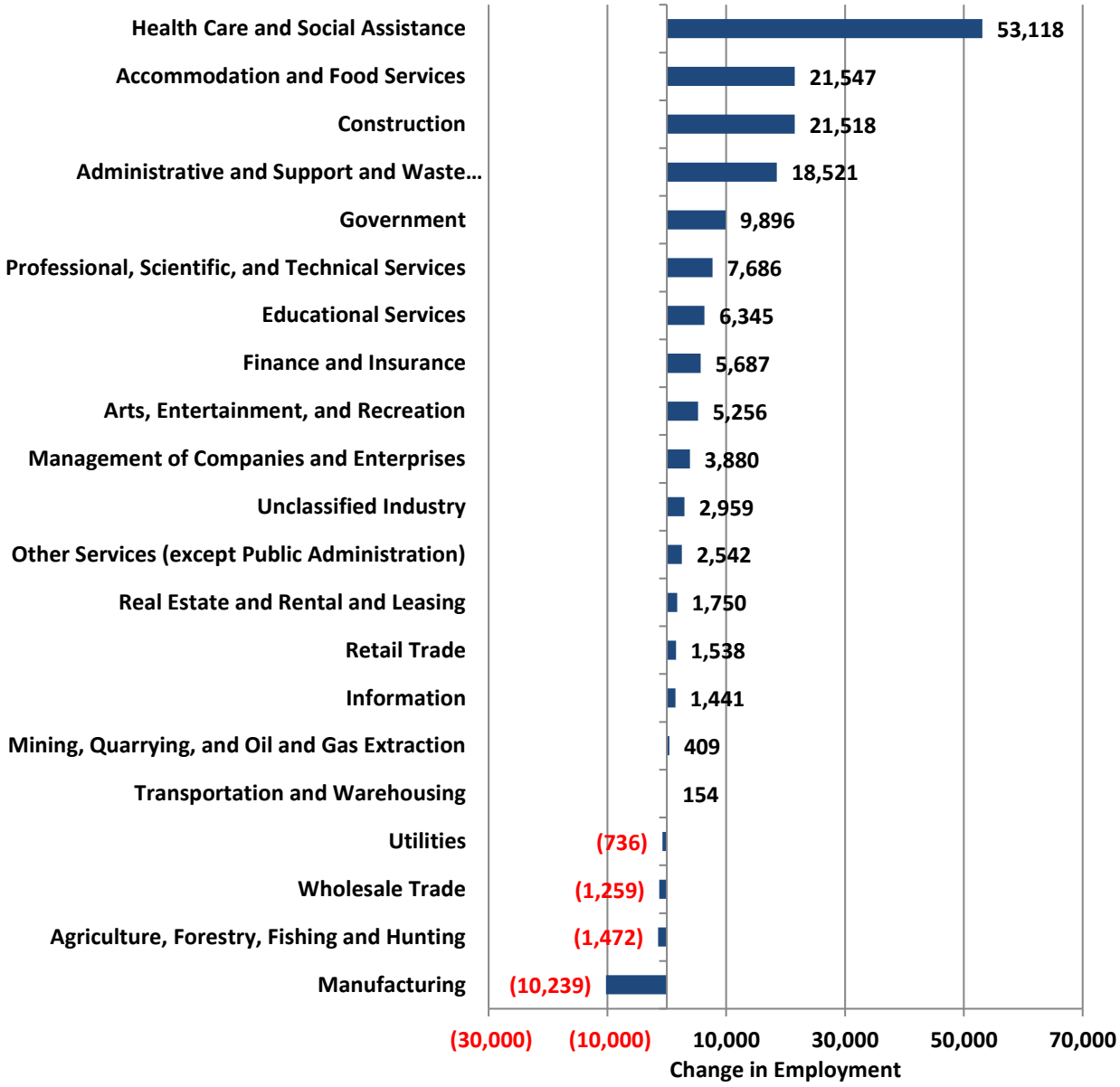
Exhibit 3.6 Orange County Annual Industry Cluster Salary Trends (2009-2017)



Source: OCBC Analysis California Employment Development Department, Quarterly Census of Employment and Wages

Between 2018 and 2028, the Orange County industry with the largest expected job growth will be Health Care and Social Assistance, which will see an additional 53,118 jobs; Accommodation and Food Services and Construction will see employment levels expand by 21,547 and 21,518, respectively, over the same time period. Employment growth within these sectors reflects local trends over the past few years with Orange County's aging population, concentrated tourism sector, and booming housing industry.

Exhibit 3.7 Projected Changes in Orange County Employment by Industry (2018-2028)



Source: Emsi

Section 4 – Industry Innovation in Orange County

Technological advances and other innovations have driven social and labor market change over the past several years, disrupting some industries while creating others. Gig economy services such as Uber, Airbnb, and Doordash, for example, reflect a broad shift from a production-based economy to one based on services and knowledge.

Other industries are also seeing transformative effects such as manufacturing, which is said to be undergoing "Industry 4.0" or the fourth industrial revolution delineated by the interconnectedness of big data, robotics, and automation, bringing dramatic benefits in the form of increased efficiency and reduced costs. The health care sector provides another example as doctors and hospitals are increasingly seeing the benefits of implementing health informatics. Aggregating, managing, and leveraging patient data in a manner that allows patient data to be securely shared between hospitals allows for more rapid and accurate collaboration between medical institutions and resulting in better and lower cost care for patients. Health care is also seeing the implementation of remote patient monitoring where patients can communicate with their primary care providers without having to leave their homes, further reducing overall costs and travel times for patients.

This, again, highlights the importance of industry clusters as they dramatically enhance a regions ability to promote innovation, economic growth, and job creation. Leveraging both competitive and collaborative benefits, industry clusters rely on the support of suppliers, investment sources, research organizations, and academia to create highly productive and innovative ecosystems that, in turn, provide high wage occupations and drive regional economic activity.

According to the most recent data release by The U.S. Cluster Mapping Project, an interactive website created by Harvard Business School and the U.S. Economic Development Administration, Orange County's most concentrated industry clusters are Medical Devices, with a location quotient of 5.30, followed by Apparel at 2.32, and Biopharmaceuticals at 2.04. A location quotient is the ratio of an industry's share of total state employment in a location relative to its share of total national employment, measuring an industry cluster concentration in a particular region. A location quotient of 1.00 means that a region has an average concentration of a particular industry. Medical Devices' location quotient of 5.30 means that that industry is more than five times as concentrated in Orange County as in the nation as a whole. Orange County's Medical Device industry cluster is the most concentrated in the nation, employing 17,335 workers. Several industry clusters in Orange County ranked third in the nation including Apparel with 3,532 employees, Lighting and Electrical Equipment with 7,073 employees, and Recreational and Small Electric Goods with 3,034 employees.

Exhibit 4.1 shows the industry clusters with the highest Location Quotients in Orange County, illustrating their local and national importance.

Exhibit 4.1 Top 10 Orange County Industry Clusters by Location Quotient

Industry Cluster	*Location Quotient*	*Employment (2016)*	*National Ranking*
Medical Devices	5.30	17,355	1
Apparel	2.32	3,532	3
Biopharmaceuticals	2.04	6,504	6
Lighting and Electrical Equipment	1.90	7,073	3
IT & Analytical Instruments	1.87	27,634	5
Hospitality and Tourism	1.86	77,547	5
Metalworking Technology	1.78	10,971	5
Communications	1.73	9,697	4
Financial Services	1.62	41,003	4
Recreational and Small Electric Goods	1.55	3,034	3

Source: U.S. Cluster Mapping, Harvard Business School, U.S. Economic Development Administration

Emsi also measures industry concentrations using location quotients, which compare the concentration of an industry in a specific area with its concentration at the national level. Emsi found that Orange County's Arts, Entertainment, and Recreation industry had its highest location quotient at 1.94, which means that this industry is almost twice as concentrated in Orange County as in the nation as a whole. Other highly concentrated Orange County industries, as shown in the chart below, include Real Estate and Rental and Leasing (1.62), and Administrative and Support and Waste Management and Remediation Services (1.42).

Exhibit 4.2 Orange County Location Quotients by Industry (2012-2017)

	2012	*2013*	*2014*	*2015*	*2016*	*2017*
Arts, Entertainment, and Recreation	1.87	1.94	1.94	2.00	1.95	1.94
Real Estate and Rental and Leasing	1.69	1.72	1.74	1.67	1.67	1.62
Administrative/Support and Waste Management	1.42	1.41	1.37	1.36	1.38	1.42
Management of Companies and Enterprises	1.11	1.17	1.25	1.24	1.33	1.35
Construction	1.21	1.24	1.26	1.30	1.33	1.34
Wholesale Trade	1.28	1.30	1.32	1.27	1.26	1.27
Professional, Scientific, and Technical Services	1.36	1.34	1.36	1.36	1.35	1.27
Finance and Insurance	1.26	1.30	1.29	1.31	1.25	1.25
Manufacturing	1.25	1.24	1.22	1.18	1.17	1.17
Accommodation and Food Services	1.14	1.13	1.13	1.13	1.13	1.13

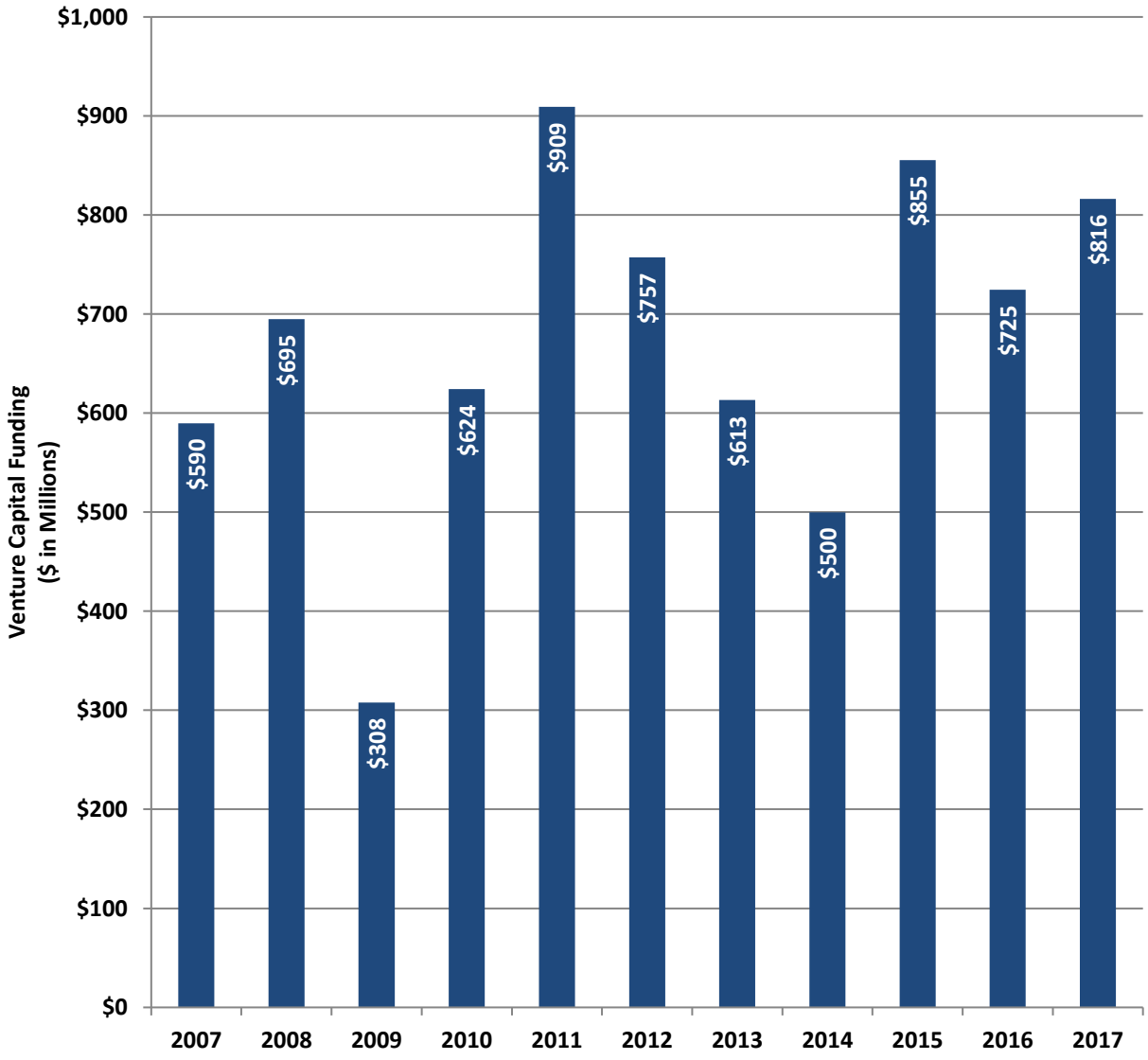
Source: Emsi

As previously highlighted, Orange County's focused industry clusters both drive economic growth and activity and increase regional innovation by attracting startups and other innovation businesses. While tracking startups is challenging, total venture capital investment provides one indicator of regional innovation. CB Insights has found that venture capital investments in Orange

County have tended to fluctuate in recent years, reaching $855 million in 2015 before dropping to $725 million in 2016 and then increasing to $816 million in 2017.

Local incubators and accelerators such as University of California, Irvine (UCI) Applied Innovation at the Cove, OCTANe, and EvoNexus provide the necessary support systems and guidance for start-ups in Orange County. Primarily located in Irvine, these organizations help start-ups secure funding, provide workspaces, and guide them through the various stages of starting a successful organization, thus helping them to avoid many of the pitfalls that startups fall into.

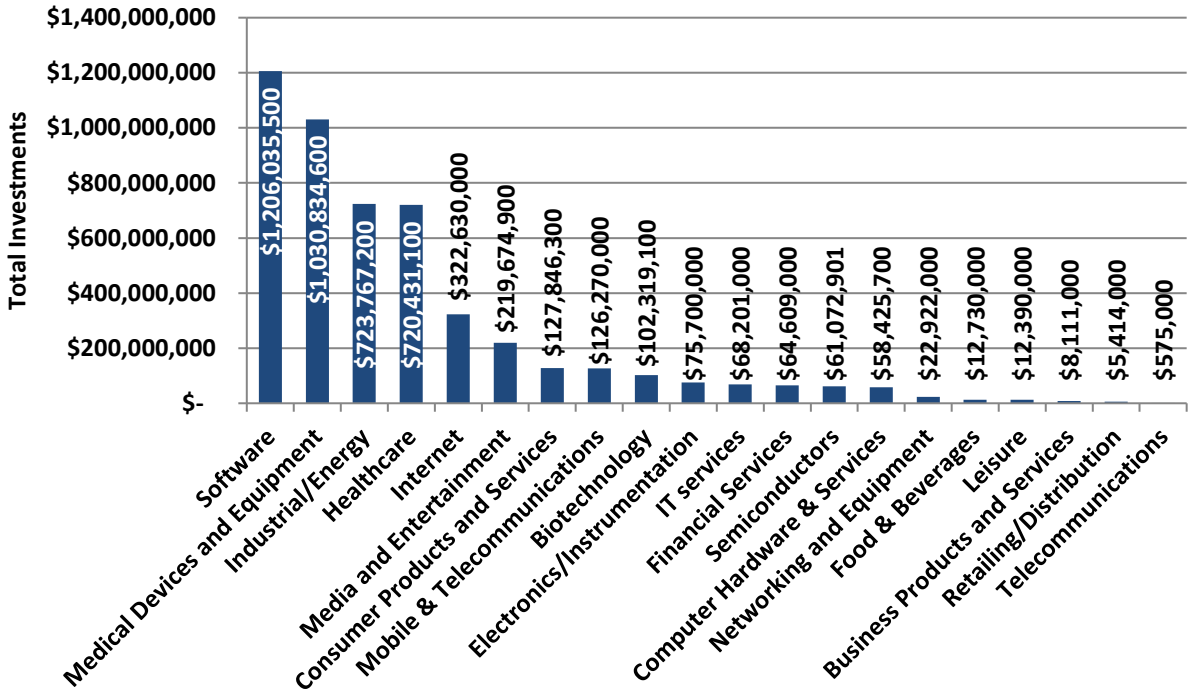
Exhibit 4.3 Venture Capital Investments in Orange County (2007 – 2017)



Source: CB Insights

Exhibit 4.4 below shows the Orange County sectors that received the most venture capital investment between 2011 and 2017. The top three sectors were Software, which received a total of $1.21 billion in investment, followed by Medical Devices and Equipment at $10.3 billion, and Industrial/Energy at $724 billion.

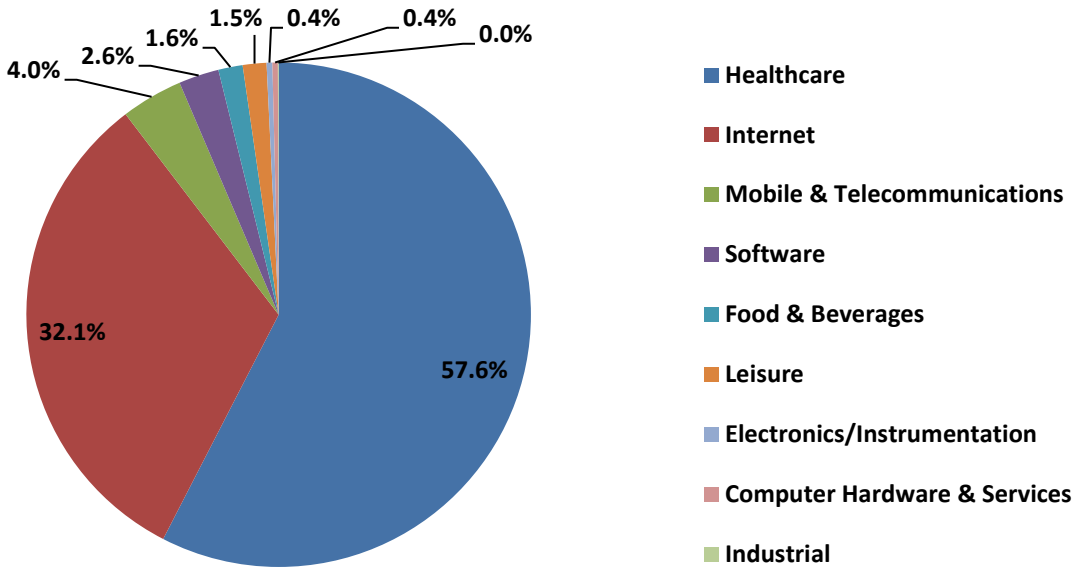
Exhibit 4.4 Venture Capital Investments in Orange County by Sector (2011-2017)



Source: CB Insights

Exhibit 4.5 isolates venture capital funding in 2017 alone and shows that Health Care saw the largest share venture capital investment in 2017, $470 million or 57.6% of the year's total. The Internet ($262 million or 32.1%), and Mobile and Telecommunications ($32.3 million or 4.0%) ranked second and third, respectively. The high investment in Health Care reflects the sector's increasing importance in Orange County. The county's aging population, as previously mentioned, will lead to increased demand for health care services.

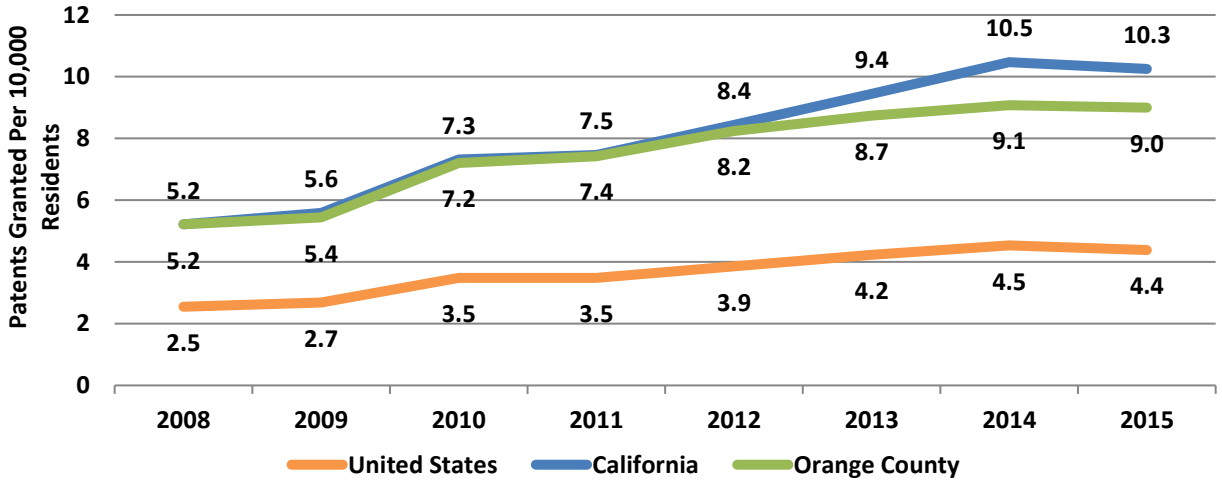
Exhibit 4.5 Proportion of Venture Capital Investments in Orange County by Sector (2017)



Source: CB Insights

Exhibit 4.6 shows another indicator of innovation, the number of patents awarded per 10,000 residents in the United States, California, and Orange County, which highlights the state and county's concentrated innovation. While Orange County and statewide rates mirrored each other between 2008 and 2011, a divergence that began in 2012 and has since increased. California had 10.3 patents per 10,000 residents in 2015, compared to only 9.0 in Orange County. This divergence is likely explained by the high level of patent growth in less-populated counties such as Santa Clara County and San Mateo County.

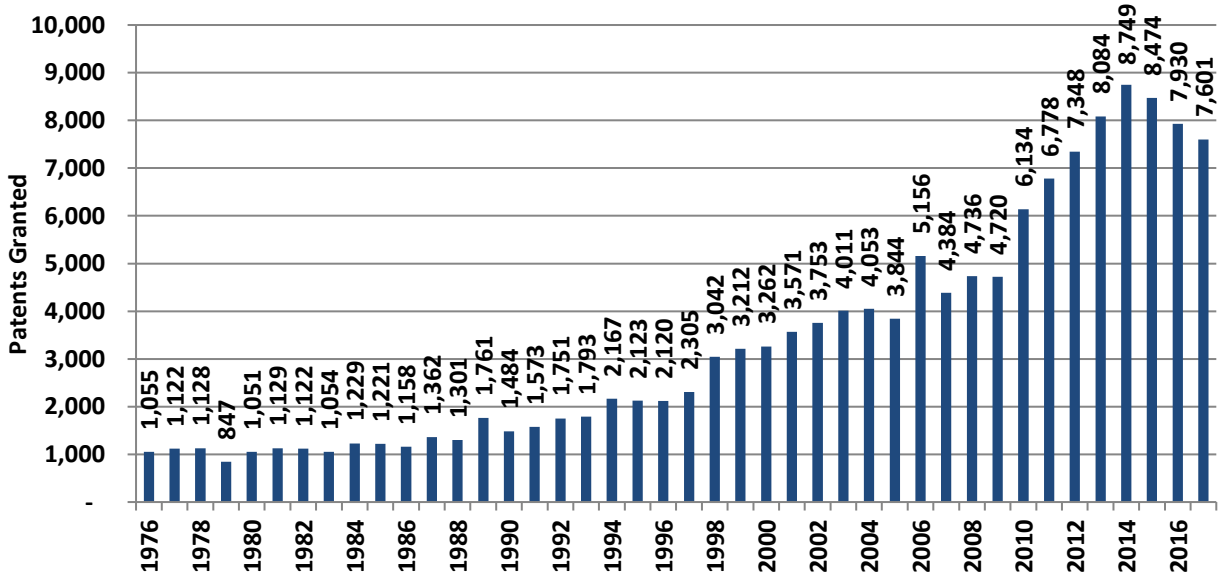
Exhibit 4.6 Patent Grants Awarded per 10,000 Residents in the United States, California, and Orange County (2008-2015)



Source: United States Patent and Trademark Office, U.S. Census Bureau – American Community Survey

Exhibit 4.7 highlights the total number of patents granted on an annual basis in Orange County since 1976 according to the U.S. Patent and Trademark's Office *PatentsView* website. Between 1976 and 1996, Orange County averaged 1,407 patents per year with the majority of those patents coming from Irvine, Anaheim, and Santa Ana. By 1997 patents had jumped to 2,305 in Orange County with 20% of them originating in Irvine. The following year saw a significant increase with total patents jumping to 3,042 representing an increase of 32% compared to the year before. Another major jump in granted patents occurred between 2005 and 2006 when patents increased from 3,844 to 5,156, representing an increase of 34.1%, likely a result of the considerable economic growth during this time period. While annual patents in Orange County would drop to 4,384 the year after, a decrease of 15%, they would jump back up to 6,134 by 2010, the unofficial end of the Great Recession, representing an increase of 30% year-over-year. After reaching a high of 8,749 patents in 2014, patents in Orange County would begin a general decreasing trend eventually hitting 7,601 in 2017, representing a decrease of 13.1% compared to 2014. Orange County's decreasing patent generation in recent years may be attributable to acquisitions of leading local patent-generating companies such as Broadcom and Allergan by companies outside of Orange County.

Exhibit 4.7 Orange County Patents Granted (1976 – 2017)



Source: United States Patent and Trademark Office - PatentView

While industry clusters and their specialization help to drive economic growth, activity, and innovation, regional collaboration between economic development organizations, academia, and businesses fosters a supportive environment for startups. UCI Applied Innovation, for example, launched "The Cove," a 46,000 square foot space for young entrepreneurs. Large meeting spaces, private offices, and a presentation room allow entrepreneurs to collaborate

together and present their ideas and business plans to their peers and potential investors. Alongside physical meetings spaces, The Cove leverages the strengths and benefits of UCI, a world-class academic institution, engages local business leaders to provide guidance and mentor entrepreneurs, and connects together innovative business ideas with investors.

UCI's Applied Innovation offers several other programs, including:

- BioENGINE, which develops impactful health solutions as part of the Bridging Innovation Gaps (BIG) initiative, which streamlines the path from UCI research to the marketplace;
- Wayfinder Incubator, which accelerates the startup lifecycle from idea formation to funding by providing physical space, guidance, and access to networks;
- Experts-in-Residence, local business leaders who volunteer their time to help young entrepreneurs;
- I-Corps, a four-week startup-oriented program for aspiring entrepreneurs;
- Tech Surge, a competition for a $25,000 grant for UCI entrepreneurs who use UCI intellectual property in their business models;
- Proof of Product (POP) Grants of up to $10,000 to bring UCI innovations to the commercial market; and
- The UCI ANTrepeneur Center, founded in 2014 "with the mission of integrating entrepreneurial and innovative thinking into the UC Irvine campus and to UC Irvine students in starting new ventures."

OCTANe connects ideas and people with resources and capital effectively creative a collaborative and cohesive environment where entrepreneurs can meet and work with investors, executives, academics, clinicians, and businesses advisors. So far, OCTANe has facilitated over $1.7 billion in capital infusion which has resulted in over 1,500 new businesses being created and adding over 8,000 jobs to the local economy. Part of OCTANe, LaunchPad, in partnership with the Orange County/Inland Empire Small Business Development Center Network (SBDC), provides guidance and provides access to capital growth resources for small businesses located in the region. Providing one-on-one sessions, presentations to expert panels, panel evaluations, and analytical feedback, LaunchPad is focused on four primary sectors including:

- Medical Devices, Biomedical and Life Science Technologies
- Information Technology (Hardware, Software, Networking, Big Data Analytics)
- Sports and Active Lifestyle Technology
- Clean Technologies

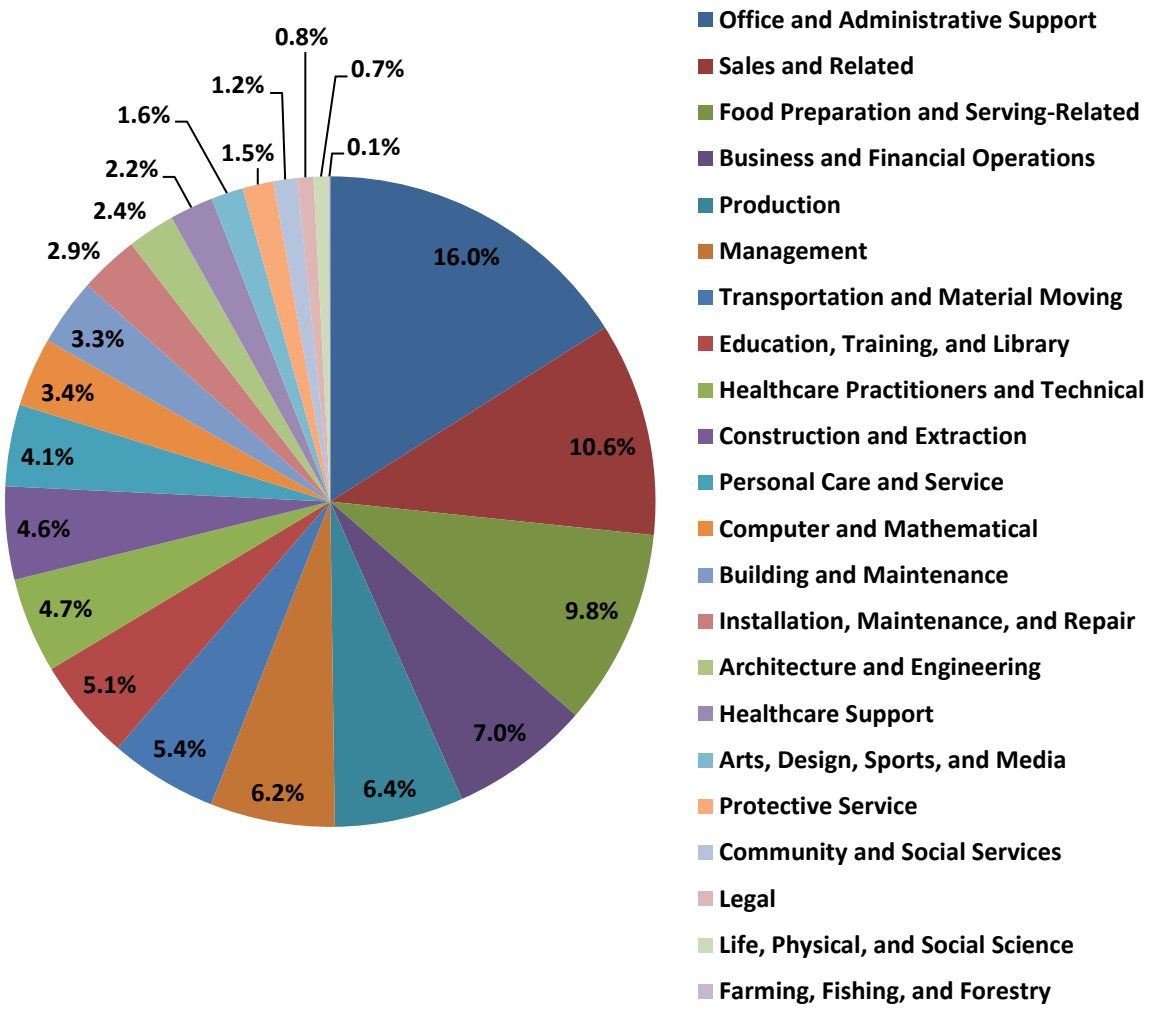
Overall, LaunchPad and the SBDC work with approximately 100 to 125 organizations per year with an average of 20 companies each year receiving funding. Since 2008, LaunchPad and SBDC have facilitated approximately $1.4 billion in capital infusion to companies. Considering the

resources currently available to start-ups and entrepreneurs in the region, organizations such as OCTANe are extremely valuable as they help guide, protect, and accelerate the development of innovative companies in the region. Launching a new business can prove extremely problematic and being supported by experts with complex networks across a number of sectors and industries can be very beneficial. While finding capital infusion is an important portion of launching a successful business, being able to tap executives, academia, and additional resources to ensure pitfalls are avoided and advantages are maximized is equally important.

Section 5 - Occupational Employment and Salary Growth

The EDD's most recent Occupational Employment Survey found that Office & Administrative Support is Orange County's largest occupational group, accounting for 16% of all county jobs. Other major occupational groups include Sales and Related Occupations, with 10.6% of county jobs and Food and Serving-Related Occupations with 9.8%. Exhibit 5.1 below highlights the occupational groups in Orange County by their proportions of total employment. According to Emsi, Office and Administrative Support occupations peaked in 2006 with 293,815 jobs before declining to 250,935 in 2010 at the depths of the recession. While increasing back to 265,234 in 2017, total occupations are projected to see a slight decrease in 2018, perhaps an early indication of the impacts of automation beginning to take hold in the office sector. While Emsi does project these occupations to increase to 273,588 by 2028, this is still well below the 2006 high.

Exhibit 5.1 Orange County Occupational Employment Distribution



Source: California Employment Development Department, Occupational Employment Survey

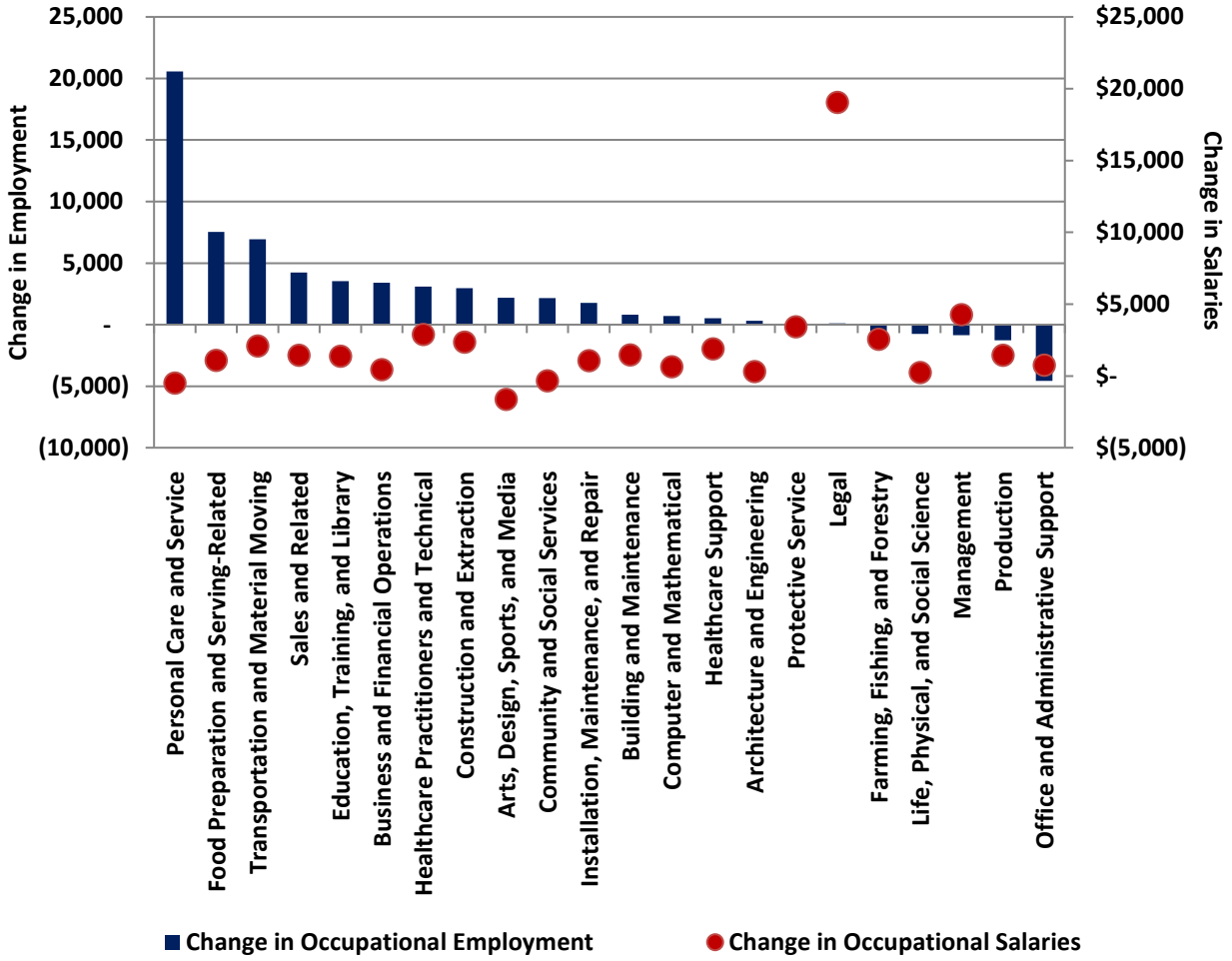
When compared to the previous year, Orange County added 53,080 jobs, representing an increase of 3.4%. Average salaries increased from $56,865 to $57,892, an increase of $1,027 or 1.8%. Looking at the growth of individual occupational groups, Personal Care and Service Occupations experienced the most dramatic increase, adding more than 20,000 jobs for a growth of 45.7%. Other rapidly growing occupational groups included:

- Food Preparation and Serving-Related Occupations (7,540 jobs, or 5.0%); and
- Transportation and Material Moving Occupations (6,940 jobs or 8.7%).

Five occupational groups saw employment losses, including Office and Administrative Occupations (-4,570), Production Occupations (-1,270), Management Occupations (-850), Life, Physical, and Social Science Occupations (-760), and Farming, Fishing and Forestry Occupations (-550).

Nearly all occupational groups in Orange County saw salary increases over the past year with the largest increases coming from Legal Occupations, where salaries increased by a staggering $19,073 or 15.8% increase. This significant increase in Legal occupations was primarily driven by the increase in annual mean wages for Lawyers, which saw wages expand by $29,163 or by 17.9% as well as Court Reporters, which saw an increase of $13,937 representing growth of 28.4%. Management occupations, which saw salaries increase by $4,290 or by 3.2% and Protective Service occupations salaries increased by $3,446 or 6.7%. Only three occupational groups saw salary decreases over the past year: Arts, Design, Sports and Media Occupations, where salaries dropped by $1,604 or by 2.8%, Personal Care and Service Occupations, where salaries dropped by $484 or by 1.7%, and Community and Social Services Occupations, where salaries decreased by $322 or by 0.6%.

Exhibit 5.2 Orange County Occupational and Salary Year-over-Year Absolute Growth



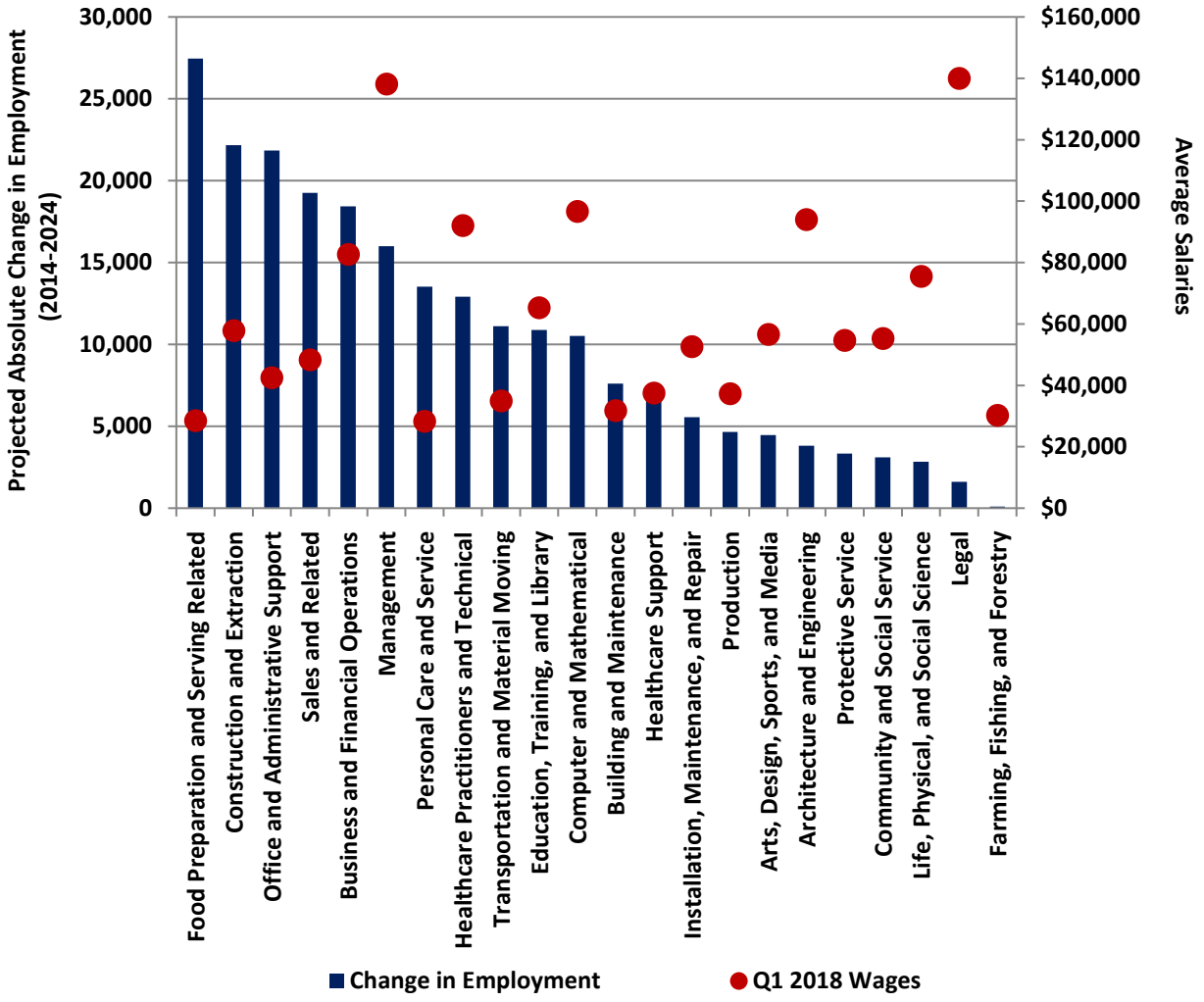
Source: California Employment Development Department, Occupational Employment Survey

The EDD estimates that Orange County will add approximately 227,900 jobs in the period between 2014 and 2024. Food Preparation and Serving-Related occupations are predicted to create the most jobs, 27,450, followed by Construction and Extraction (22,160), and Office and Administrative Support (21,840). These three occupational groups, however, all pay relatively low wages. High-growth occupations that pay above-average wages include:

- Business and Financial Operations (an estimated 18,439 jobs at an average salary of $82,680);
- Management (an estimated 16,000 jobs at an average salary of $138,170); and
- Healthcare Practitioners and Technicians (12,910 jobs at an average salary of $92,042.)

Looking at employment projections provided by the EDD, Orange County is expected to add approximately 227,900 jobs between 2014 and 2024.

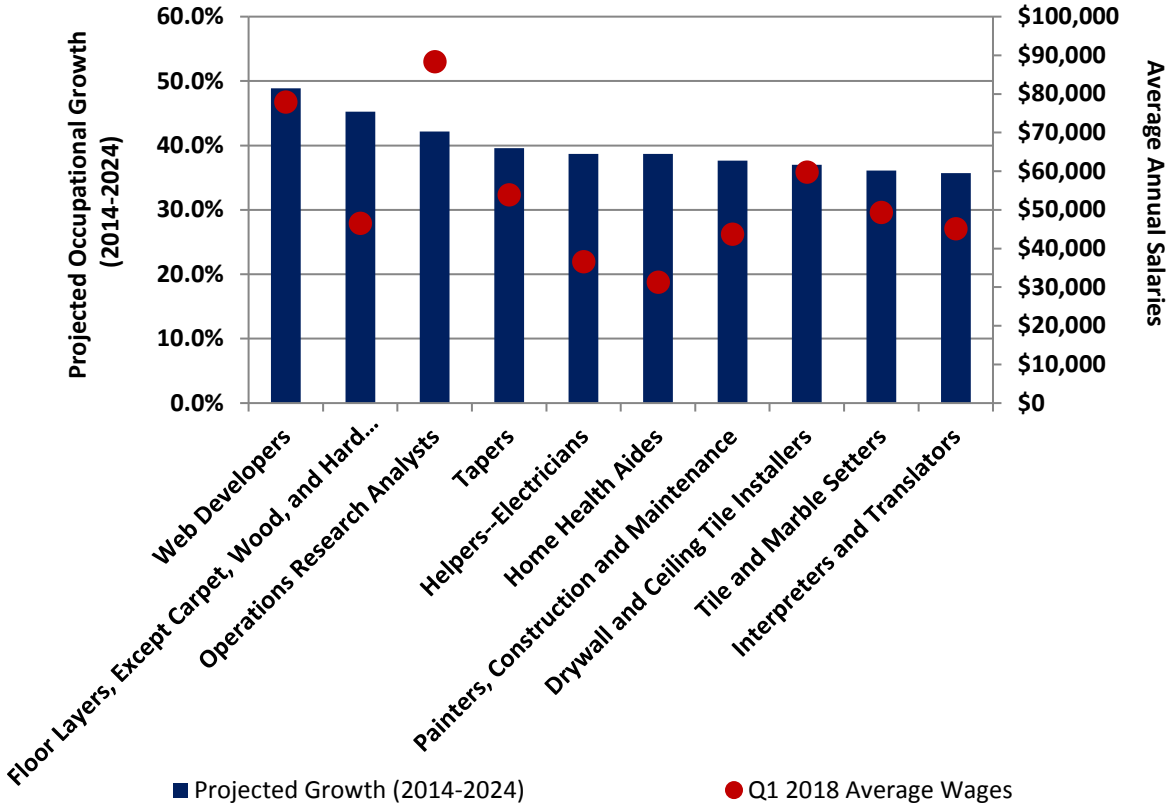
Exhibit 5.3 Projected Orange County Employment Growth by Occupational Group and Current Average Salaries (2014-2024)



Source: California Employment Development Department, Employment Projections

The EDD estimates that Web Developers (+48.9%), Floor Layers, Except Carpet, Wood and Hard Tiles (+45.2%), and Operations Research Analysts (+42.2%) will be the fastest growing occupations by percentage between 2014 and 2024. The first two occupations are part of Orange County's most rapidly expanding industries, Information Technology and Construction.

Exhibit 5.4 Average Salaries of Fastest-Growing Occupations in Orange County (2014-2024)



Source: California Employment Development Department

Section 6 - Income and Poverty Statistics

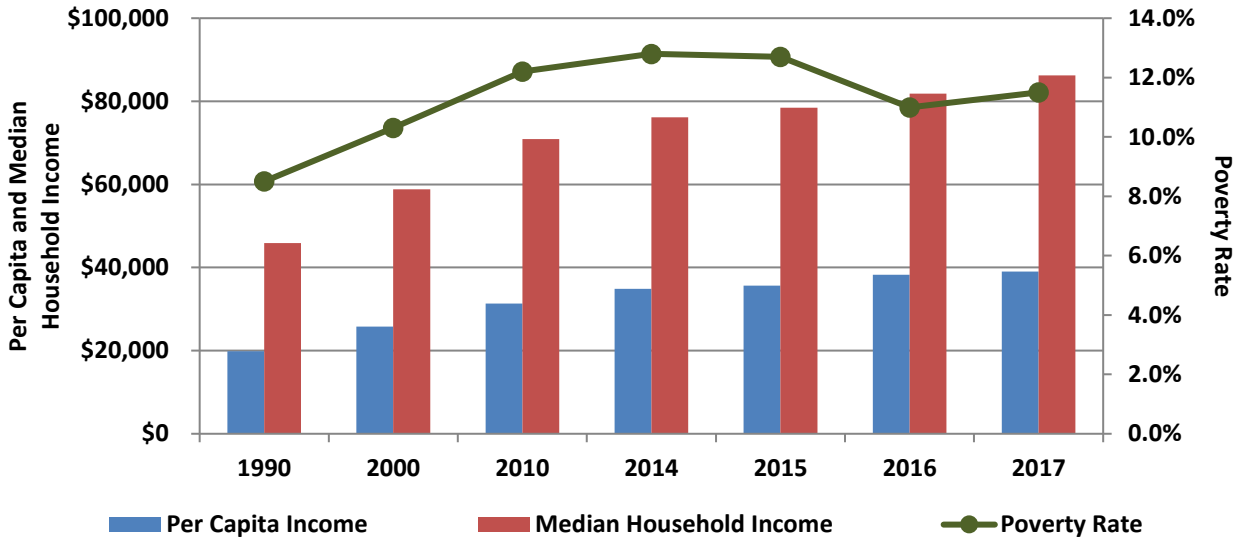
The local and statewide housing affordability crisis makes it increasingly important to track regional income growth, which could partially offset extremely high home prices. The U.S. Census Bureau's most recent American Community Survey (ACS) found that Orange County's median household income grew by $4,380 or 5.4% between 2016 and 2017, reaching $86,217 in 2017. Orange County's 2017 average household income was 20.1% higher than the state average of $71,805 and 42.9% higher than the national average of $60,336. County per capita incomes increased by $791, or 2.1%, between 2016 and 2017.

According to the U.S. Census Bureau's 2017 estimates at the national level, median household incomes increased by $2,719 during the same time period, representing an increase of 4.7%. It is important to note that while the U.S. Census Bureau includes the deflationary impacts of increases in the Consumer Price Index (CPI) in its measure of median annual incomes, estimates vary when looking at other sources including the BLS. According to the BLS, the real average hourly earnings at the national level increased by only 0.4% between December 2016 and December 2017 suggesting much more tepid growth. While both the BLS and U.S. Census Bureau use the Current Population Survey (CPS) as the basis for their estimates of income and earnings, the BLS's measure reflects earning before taxes and other deductions (overtime pay, commissions or tips) and excludes self-employed workers while the U.S. Census Bureau's measure includes wages, salaries, and self-employment income received during the full calendar year and supplements the CPS with data from the Annual Social and Economic (ASEC) supplement.

County poverty rates (Exhibit 6.1), however, increased between 2016 and 2017, rising from 11% to 11.5%, although 2017's poverty rate was still below 2015's rate of 12.7%. This increase in poverty reflects the region's housing affordability crisis, and makes it imperative that local stakeholders and policymakers create strategies to increase prosperity for all Orange County residents.

The 2017 *Orange County Economic Development Strategy* (CEDS) identifies struggling census tracts, or "red-zones," in Orange County as those with a combination of below-average income above-average employment, compared to national rates. Orange County had a total of 55 red-zones in 2018, a slight increase over the previous year.

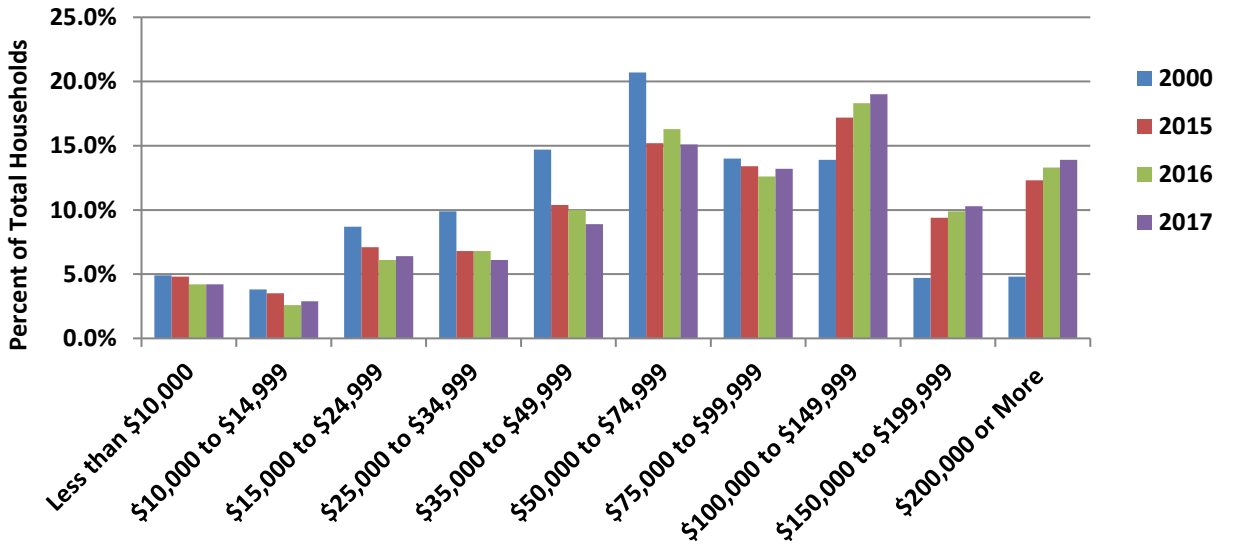
Exhibit 6.1 Orange County Income and Poverty Rates (2000-2017)



Source: U.S. Census Bureau, 2017 American Community Survey, 1-Year Estimates

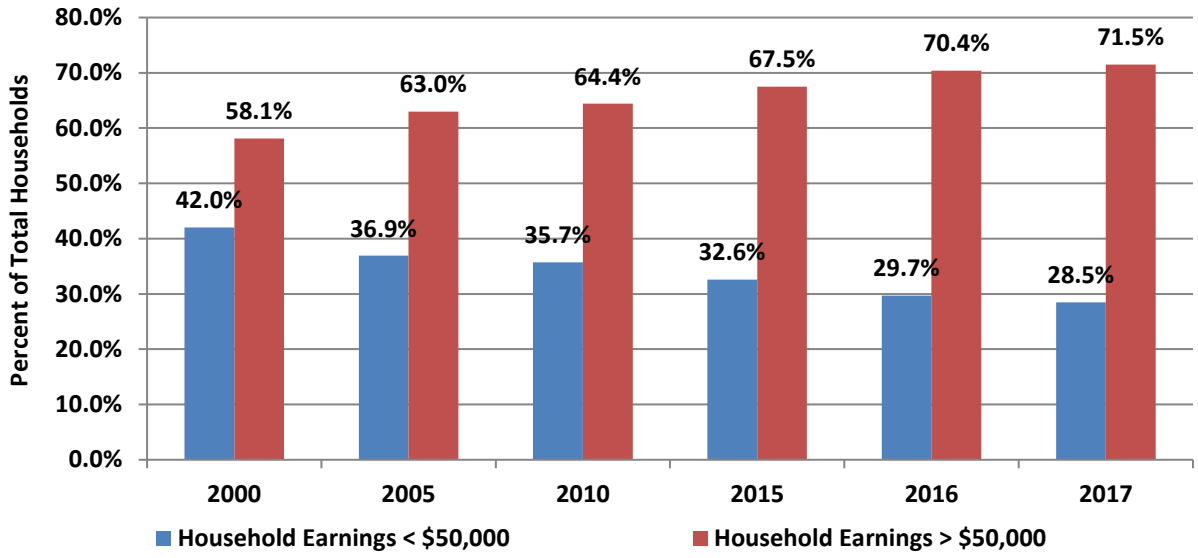
Exhibit 6.2 below illustrates another aspect of the Orange County economy, the percentage of county households in various income groups. The U.S. Census Bureau's ACS found that 19.0% of Orange County households made between $100,000 and $149,999 in 2017, making it the county's largest income group. The $50,000 to $74,999 income group accounted for 15.1% of county households, followed by the $200,000 or more group at 13.9%. While lower income groups have generally declined in proportion in recent years, several saw increases between 2016 and 2017.

Exhibit 6.2 Orange County Household Income Profile



Source: U.S. Census Bureau, 2017 American Community Survey, 1-Year Estimates

Exhibit 6.3 Percent of Orange County Households Earning Above or Below $50,000



Source: U.S. Census Bureau, 2017 American Community Survey, 1-Year Estimates

According to the most recent estimates of poverty from the U.S. Census Bureau, which uses federal-level standards, Orange County has a lower poverty rate than neighboring counties and the state and nation as a whole. According to the California Poverty Measure (CPM), however, Orange County has a higher poverty rate than Riverside and San Bernardino Counties, as wells as California as a whole, due to a higher cost of living. Despite this comparatively higher score largely driven by the higher cost-of-living in Orange County, the CPM in the region has seen a general decrease in poverty rates over the past few years, mirroring trends in the official poverty rate measure provided by the U.S. Census Bureau. The CPM, which was developed by the Public Policy Institute of California and Stanford University, takes cost of living as well as other California-specific factors into account to provide a potentially more accurate measure of poverty. Exhibit 6.4 below shows Orange County and its peers according to both poverty measures.

Exhibit 6.4 Poverty Rates by Region (2016)

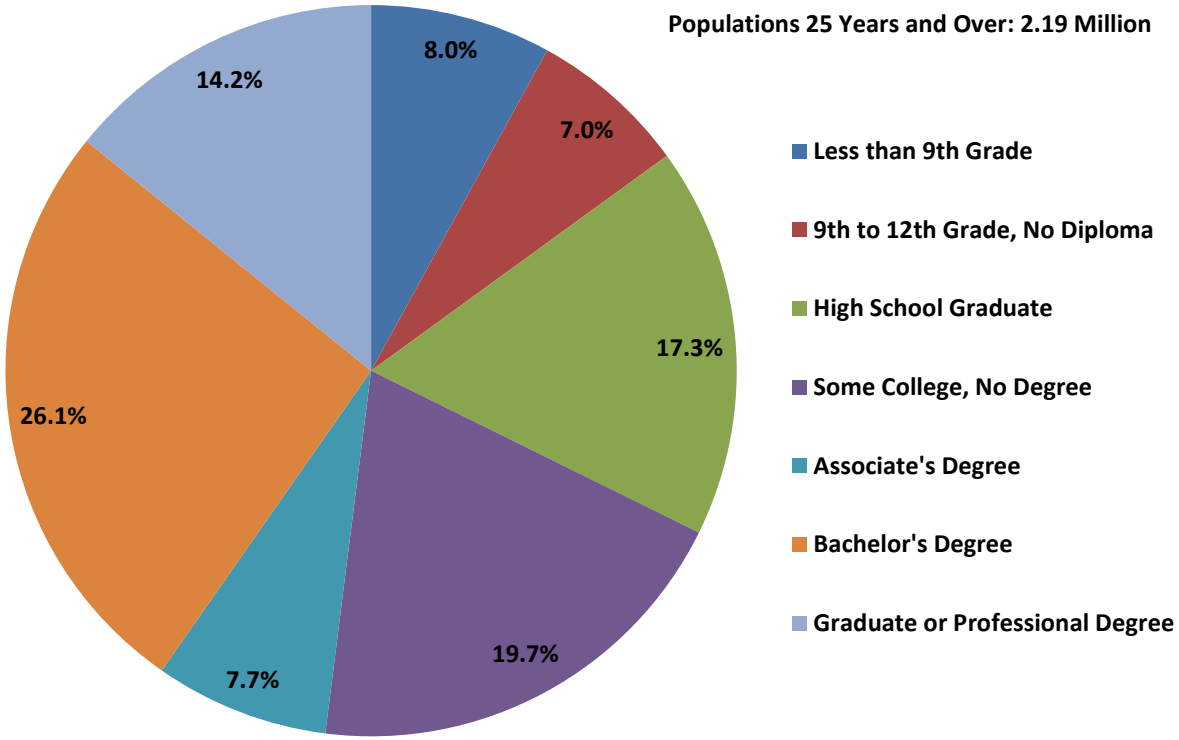
County	Percentage in Poverty, Official Poverty Rate Measure	Percentage in Poverty, CPM Measure	Differential	Percentage of Children Ages 17 and Below in Poverty, Official Rate
Orange	11.0%	20.9%	9.9%	14.4%
Los Angeles	16.3%	24.3%	8.0%	23.4%
Riverside	15.3%	18.3%	3.0%	21.1%
San Bernardino	17.7%	18.2%	0.5%	26.0%
California	14.3%	19.4%	5.1%	19.9%
United States	14.0%			19.5%

Source: U.S Census Bureau, Public Policy Institute of California, Stanford University

Section 7 - Educational Attainment Demographics

Orange County's highly educated population is one of its primary competitive advantages. As highlighted in Exhibit 7.1, 48% of county residents had an associate's degree or higher in 2017, a small increase over the previous year. As the national—and global—labor market continues to evolve, Orange County needs to maintain this key competitive advantage, which attracts businesses and fuels innovation and economic growth.

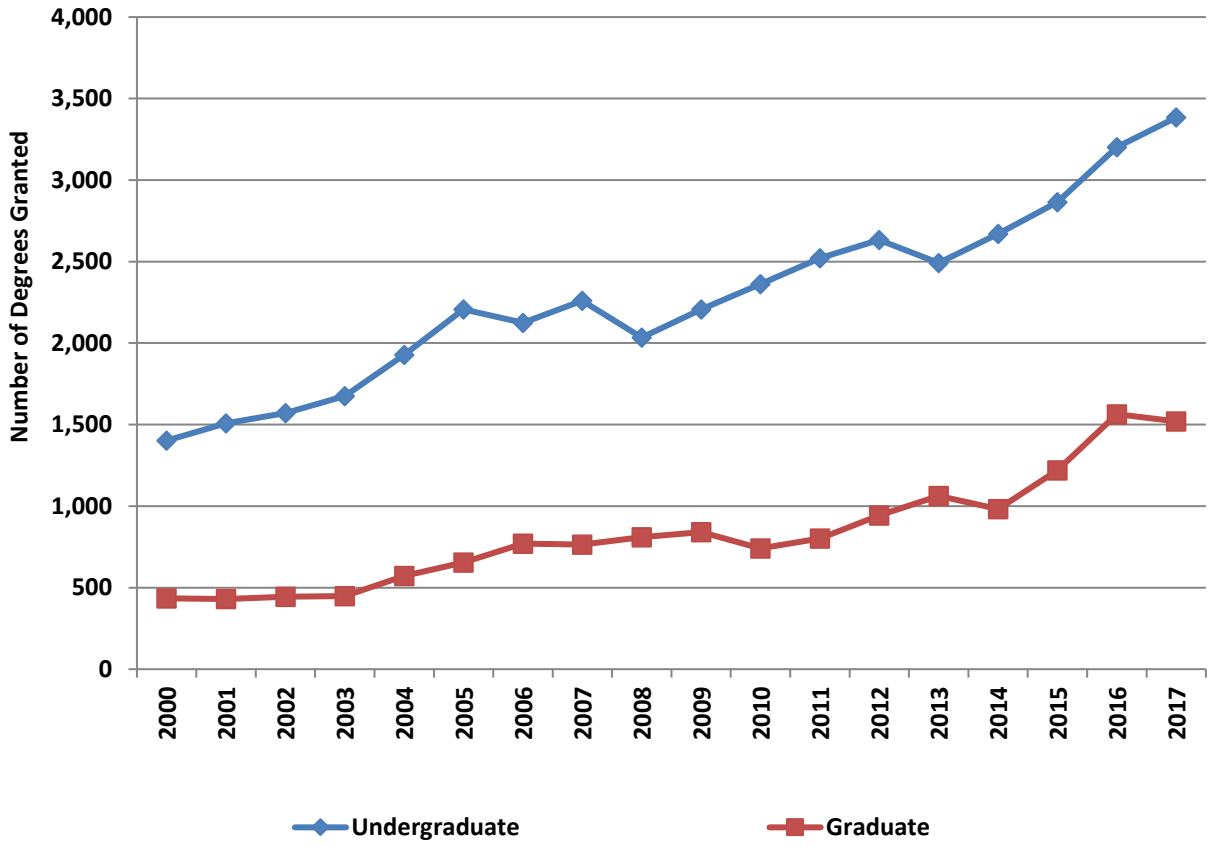
Exhibit 7.1 Orange County Educational Attainment, Population over 25 (2017)



Source: U.S. Census Bureau, 2017 American Community Survey, 1-Year Estimates

Exhibit 7.2 below provides another indicator of Orange County's educational attainment, the number of science, technology, engineering, and mathematics or STEM-related degrees awarded at its three major universities: the University of California, Irvine; California State University, Fullerton; and Chapman University. While the total number of undergraduate degrees increased by almost 200 from 2016 to 2017, the number of graduate degrees actually dropped by 44. This decrease could be due to the county's generally healthy job market, which encourages some individuals to enter the job market rather than pursuing further education, or due to the region's high cost of living, which could prevent younger residents from affording additional tuition.

Exhibit 7.2 Orange County Tech-Related Degrees Granted (2000 – 2017)

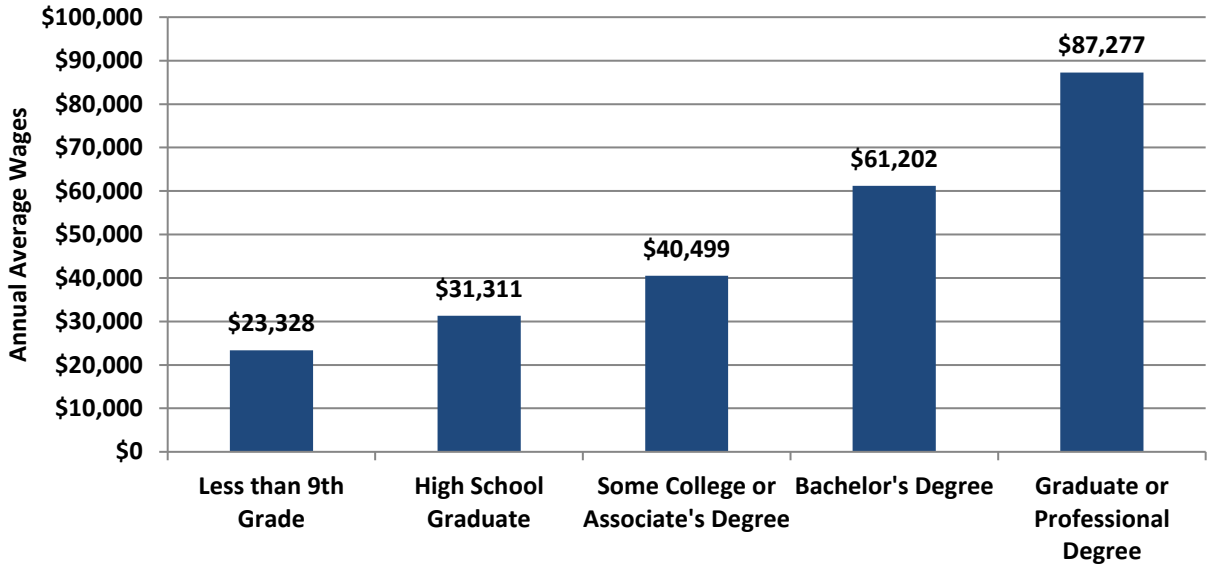


Source: OCBC Analysis of University of California, Irvine; Chapman University; California State University, Fullerton; Emsi Data

Orange County's educational system will need to reflect the continued evolution of its labor market. While fundamental skills, abilities, and knowledge bases will remain relevant in this new era, students will also need to learn the cutting-edge skills and abilities necessary to succeed in today's labor market. While this will require a collaborative effort between academia, workforce development professionals, and local employers, it will better align employee skills with employer needs and will help to slow the skills gap and prepare today's students for work in new and emerging industries.

While bachelor's degrees will remain important in the labor market, alternatives such as associate's degrees and certification programs are gaining in importance, especially as the cost of higher education continues to skyrocket. For students, these degrees provide a strong mix of both "baseline" and "specialized" skills for a lower investment of both money and time, allowing them to quickly enter the workforce. For employers, these programs provide workers with the necessary key middle-skills to fill job openings.

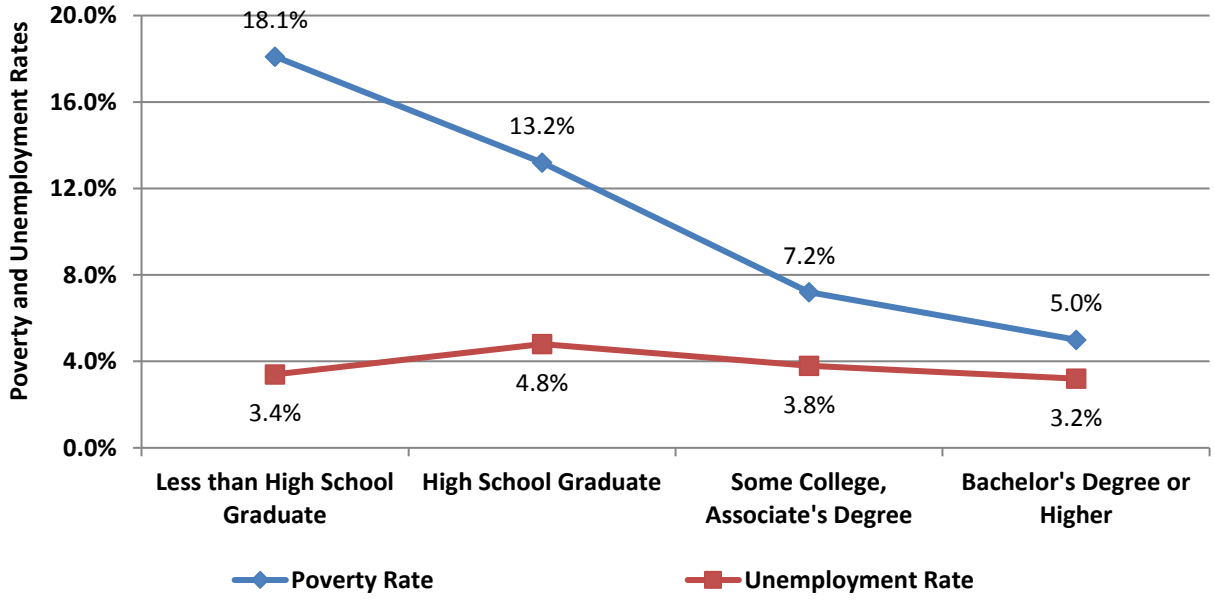
Exhibit 7.3 Median Wages by Educational Attainment, Orange County Workers over 25 (2017)



Source: U.S. Census Bureau, 2017 American Community Survey, 1-Year Estimates

Despite the increasing cost of higher education, Exhibits 7.3 and 7.4 highlight the significant benefits associated with increased educational attainment: higher median wages, lower unemployment, and a lower risk of poverty.

Exhibit 7.4 Orange County Unemployment & Poverty Rates by Educational Attainment (2017)



Source: U.S. Census Bureau, 2017 American Community Survey, 1-Year Estimates

Section 8 - Housing Market and Construction Activity

Driven by both high demand and low supply, Orange County's strong housing and rental markets continue to reach new highs, fueled by the county's thriving job market and high quality of living. This trend, however, does have significant negative consequences; many current and potential residents, especially young workers, have been priced out of Orange County. This, in turn, encourages many residents to move to lower-cost areas such as the Inland Empire and commute to work, which exacerbates Orange County's existing traffic problems.

Using data provided by the California Association of Realtors and Corelogic, Exhibit 8.1 below shows Orange County home prices from January 2008 to August 2018 for both new and existing single-family homes. New home prices rose to an average of $838,500 in August 2018, while existing home prices increased by 6.1% year-over-year, reaching $727,000. These home prices, which have far surpassed pre-recession highs, reflect both Orange County's thriving economy and regional affordability concerns.

Exhibit 8.1 Orange County Median Home Prices (2008-2018): New vs. Existing Homes

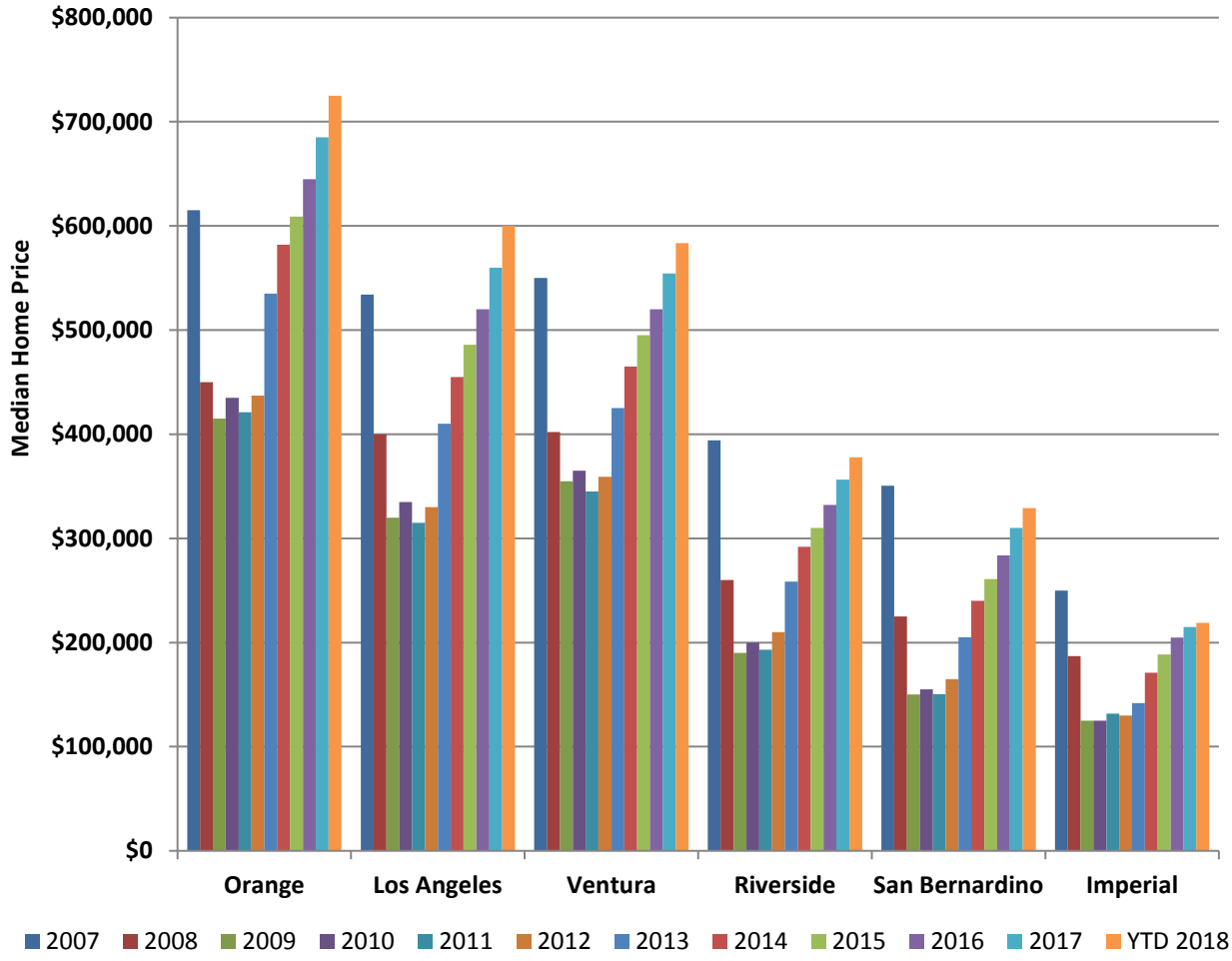
Source: California Association of Realtors, CoreLogic

According to Chapman University's *40th Annual Chapman University Economic Forecast*, Orange County home prices appreciated by 3.0% in 2016 and 6.4% in 2017, but price appreciation is projected to slow to 5.2% in 2018. Chapman researchers predict that higher mortgage rates will further reduce overall affordability and a tight housing supply will keep prices relatively high.

Exhibit 8.2 below shows median home prices from 2007 to August 2018, which are the most recent figures. Changes in these prices reflect the Great Recession and subsequent recovery. While Orange County home prices have surpassed 2007 highs by over $100,000, housing markets in other counties, such as Riverside, San Bernardino, and Imperial Counties have yet to fully recover from the Great Recession.

According to CoreLogic and DQNews, Orange County structures sold for a median price of $725,000 in August 2017, which is significantly higher than in Los Angeles ($600,000) and Ventura ($583,500) Counties. Orange County's high price reflects, among other things, the high demand for coastal properties. High demand for Orange County properties, as previously mentioned, has created major affordability concerns.

Exhibit 8.2 Southern California Regional Home Prices (All Structures, 2007-August 2018)

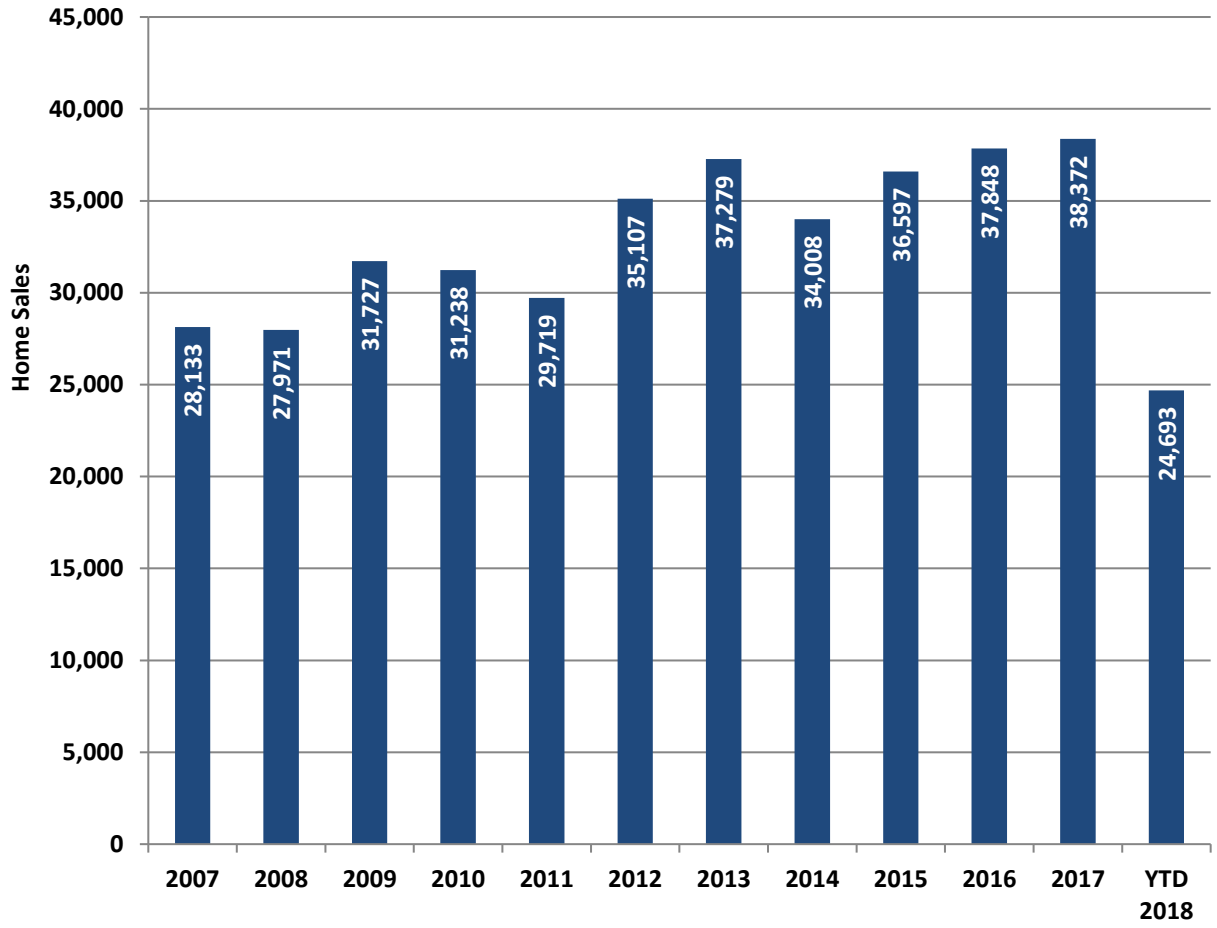


Source: CoreLogic, DQNews, August 2018

Exhibit 8.3 further illustrates housing demand in Orange County by showing home sales between 2007 and August 2018. With the exception of a small drop in 2014, home sales have trended

upward since 2012. More than 10,000 more homes were sold in 2017 than in 2007. Despite relatively low levels of supply, Orange County is on track to match 2017 sales in 2018.

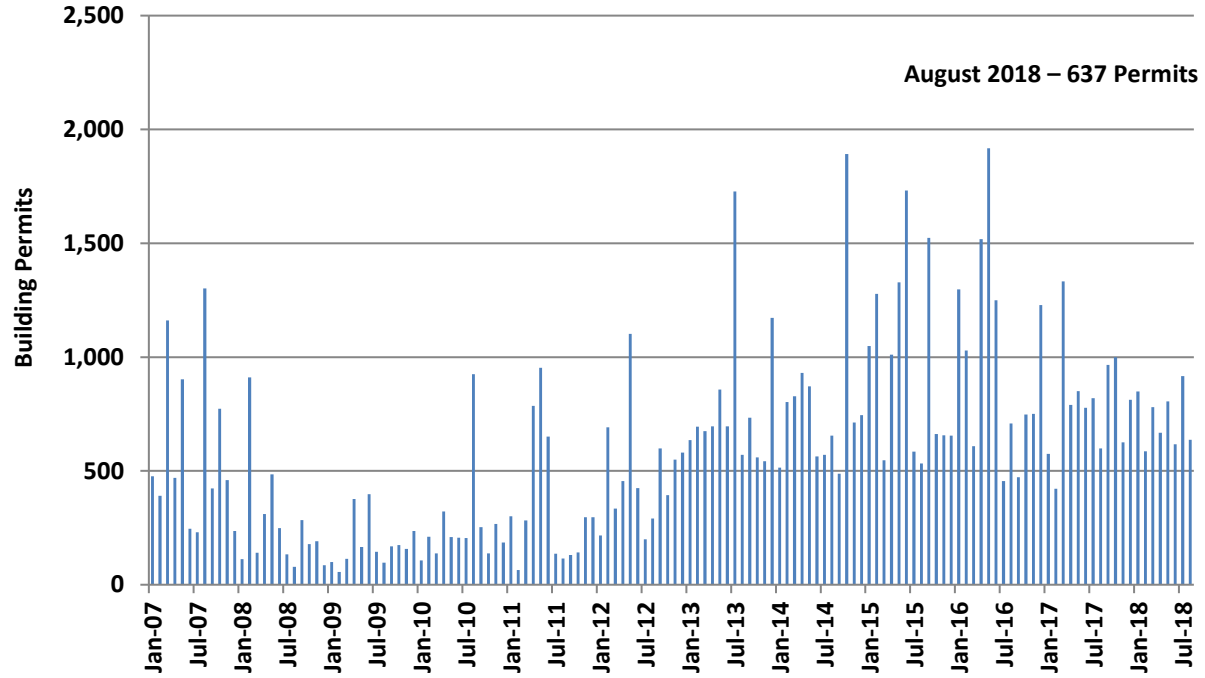
Exhibit 8.3 Orange County Home Sales (2007-August 2018)



Source: CoreLogic, DQNews

Building permits are another important housing market indicator (Exhibit 8.4). According to the U.S. Census Bureau's Building Permit Survey, county building permits have increased dramatically over the past decade from 182 per month in 2009, to 487 per month in 2012, and to almost 1,000 per month in 2016. This average, however, dropped to 797 in 2017 and has fallen further to 733 in 2018 so far. Only 637 building permits were issued in August 2018. This decline in building permits, in turn, reflects Orange County's low—and decreasing—housing supply. Within Orange County, Irvine had the most building permits in August 2018, 271, followed by Lake Forest (73), Brea (35) and Anaheim (34).

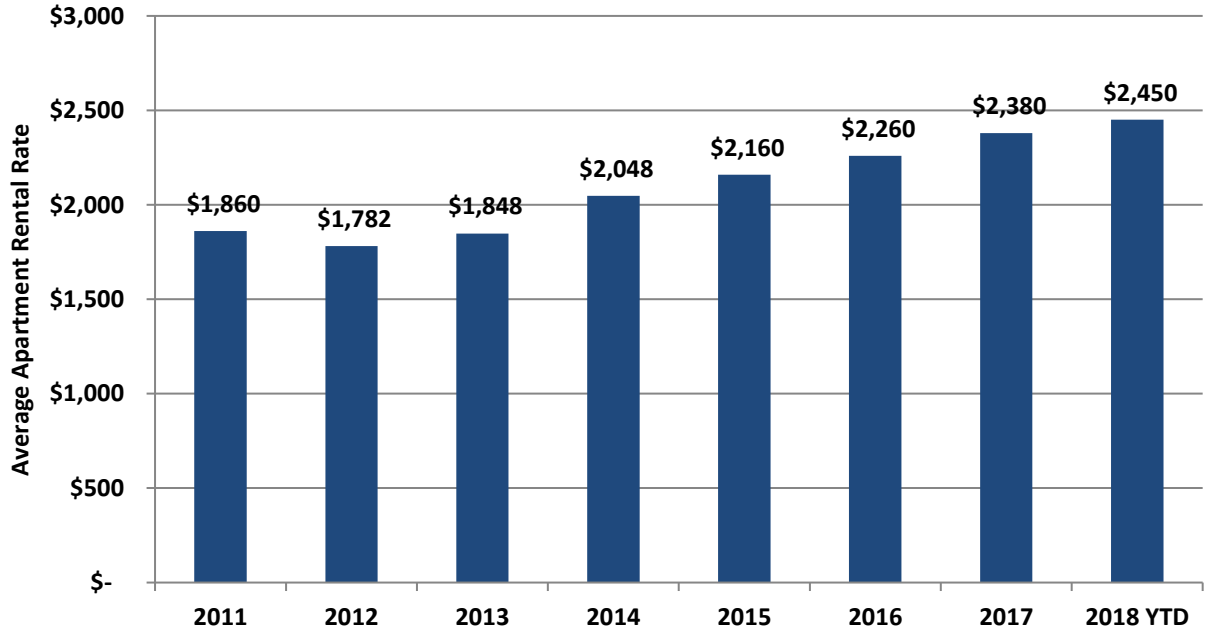
Exhibit 8.4 Orange County Building Permits (2009-2018)



Source: U.S. Census Bureau, Building Permit Survey

Orange County apartment rental rates have mirrored the rise in home prices, increasing from $2,380 in 2017 to $2,450 in August 2018, which is a 2.9% increase.

Exhibit 8.5 Orange County Average Apartment Rental Rates (2012 – 2018 YTD)



Source: Zillow

Orange County's affordability concerns, if not addressed, could begin to impact the County's labor market and overall economic health. According to both the Traditional Housing Index and First-Time Buyer Affordability Index from the California Association of Realtors, which measure the percentage of households that can afford to purchase a median price home in a specific region, Orange County is the least affordable county in Southern California. Only 20% of Orange County households could afford to purchase a median-priced home as of Q2 2018, a slight year-over-year and quarterly decrease. Prospective homeowners would need a minimum qualifying income of $175,930, more than twice the county's average household income, to afford a median-priced home.

Exhibit 8.6 California Association of Realtors Affordability Index

	Traditional Affordability Index			First-Time Home Buyer Affordability Index		
County	**Q2 2018**	Q1 2018	Q2 2017	**Q2 2018**	Q1 2018	Q2 2017
Orange County	**20**	21	21	**37**	39	40
Los Angeles	**26**	28	28	**44**	45	46
Riverside County	**37**	39	39	**57**	58	58
San Bernardino	**49**	52	51	**66**	68	68
San Diego	**23**	26	26	**43**	46	45
Ventura	**28**	31	27	**49**	52	49

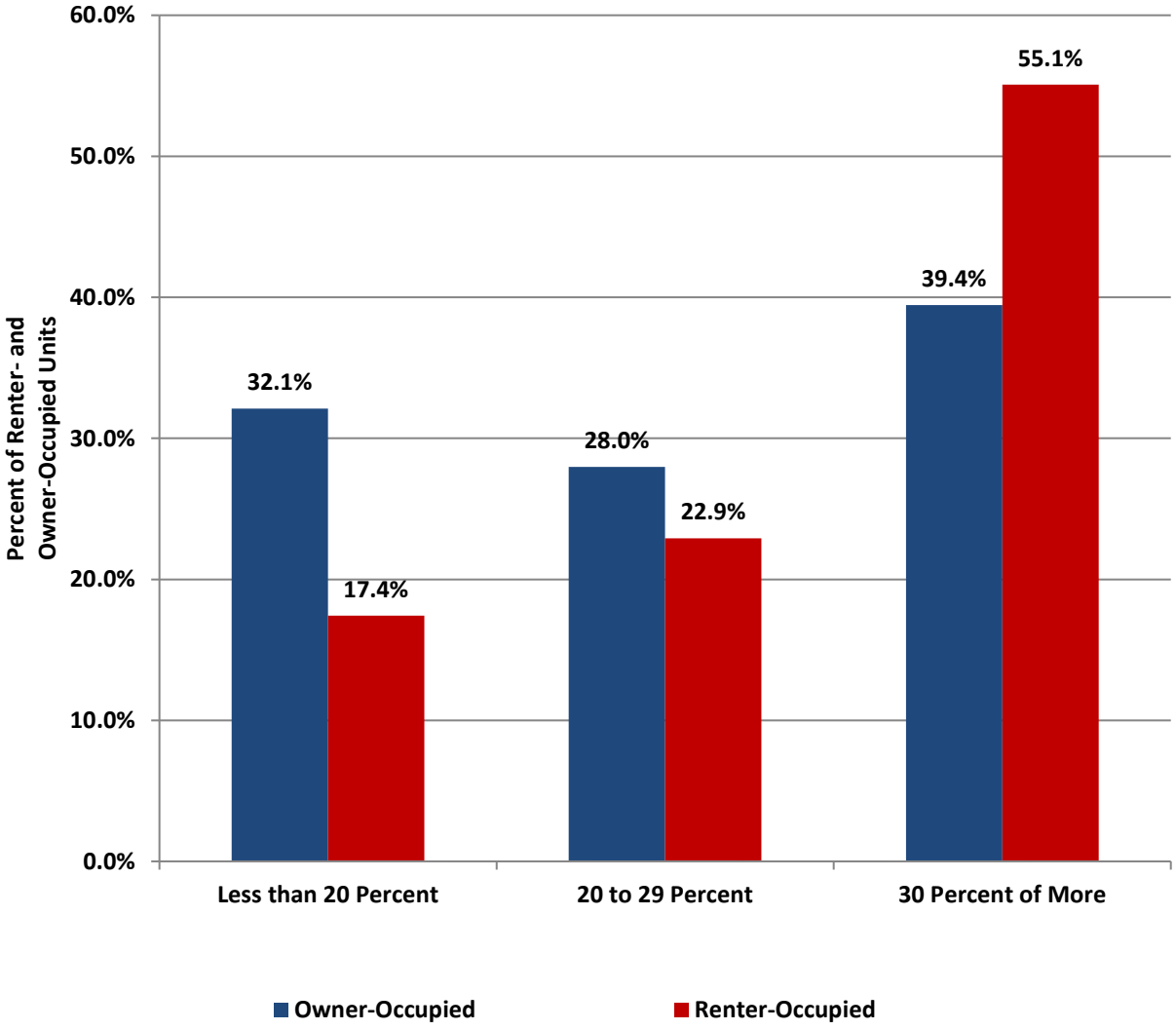
Source: California Association of Realtors

As home prices continue to increase in Orange County, primarily driven by low supply levels, sales have been decreasing dramatically with the most recent measure from the California Association of Realtors indicating a year-over-year drop of 21.8% in sales in September 2018. Taking into account householder data from the U.S. Census Bureau, households with incomes over $100,000 represented 43.2% of all households in Orange County compared to 27.8% at the national level, while households making under $50,000 represented 28.6% of all households in Orange County compared to 42.1% at the national level. Additionally, in Orange County, 29.2% of households with incomes above $100,000 were aged 45 and older compared to 13.7% being between 25 and 44 years old. This indicates that individuals purchasing homes in Orange County are more likely to be older, more affluent individuals as opposed to new families.

As older generations enjoyed significantly higher wage gains and were largely unaffected by troubling increases in student loan debt—which has so far put off large purchases for many younger individuals—they were able to make home purchases earlier and better invest in a booming stock market, both providing significant returns and increasing affordability. Also, simply by having worked for longer, older individuals are more likely to be able to save and afford Orange's County high home prices. Finally, Orange County has seen an influx of foreign investment in recent years as foreign investors in many cases put in all-cash offers to secure home purchases.

Further exemplifying the housing affordability concerns in Orange County, Exhibit 8.7 highlights the portion of incomes spent on housing by both homeowners and renters. For several decades, the general rule of thumb for spending on housings costs has been 30% of an individual's income. According to the U.S. Census Bureau's 2017 ACS, approximately 39.4% of homeowners in Orange County spend more than 30% of incomes on housing costs while a staggering 55.1% of renters in Orange County spend 30% or more of incomes on housing. With residents spending such a significant portion of their incomes on housing, this reduces their ability to save and spend on other consumer products, limiting potential economic activity and growth in the region.

Exhibit 8.7 Orange County Renter and Owner Housing Costs as a Percent of Income (2017)

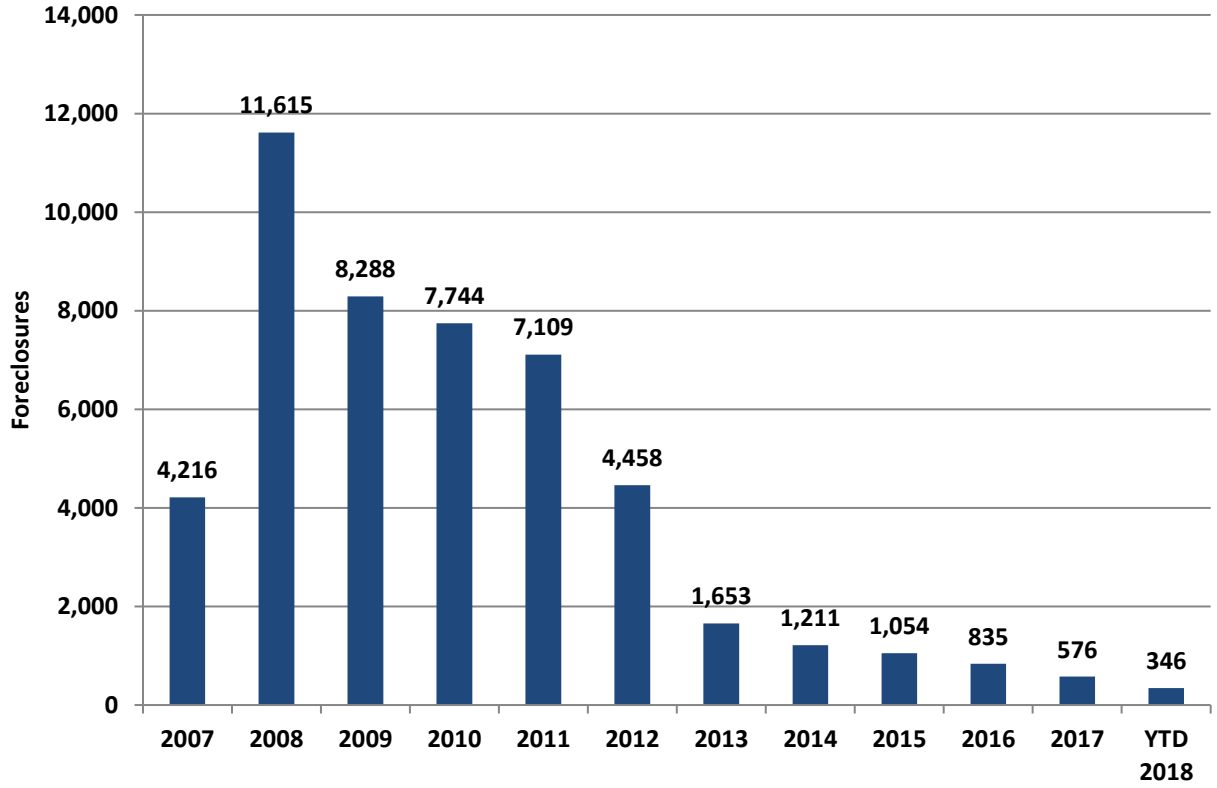


Source: U.S. Census Bureau, 2017 American Community Survey, 1-Year Estimates

While there has been significant discussion of a potential housing bubble forming, county foreclosures have steadily decreased since peaking at 11,615 in 2008 and are now at their lowest

level in the past decade. This illustrates a resilient aspect of Orange County's housing market; county residents who can purchase homes are able to afford them.

Exhibit 8.8 Orange County Foreclosures (2007- August 2018)



Source: CoreLogic, DQNews

Section 9 - Appendix

Alongside this report, the Orange County Business Council (OCBC) and its community and regional partners also provide a variety of other economic and demographic reports, including:

- *2019 Orange County Workforce Indicators Report*: A product of the research partnership between OCBC, County of Orange, and Orange County Development Board, the Workforce Indicators Report examines the growth of industry and employment, salary and wage trends, demographic changes and the educational attainment of Orange County students. Click here for a link to the most recent edition.

- *2018 Orange County Community Indicators Report*: The product of a partnership between Children & Families Commission of OC, Orange County United Way, CalOptima, the Orange County Community Foundation, PIMCO Foundation, Orange County Department of Education, Hope through Housing Foundation, Orange County Funders Roundtable, JPMorgan Chase, the County of Orange, OCBC, and La Jolla Institute, the 2017 Orange County Community Indicators Report focuses on three pivotal issues currently facing Orange County: housing, children's health and wellbeing, and the opportunity gap between high- and low-income families and their children. The report also updates previous reports' information about population, demographic, and workforce trends. Click here for a link to the most recent report.

- *2015 Orange County Workforce Housing Scorecard*: The 2015 Workforce Housing Scorecard analyzes current and projected housing trends and their impacts on the county's economy, demographics, and business competitiveness. The OC Workforce Housing Scorecard report will be updated in 2018. Click here for a link to the report.

- *Orange County 2013-2018 Comprehensive Economic Development Strategy* (CEDS): Created through a partnership between the Orange County Development Board and OCBC, this report represents an annually updated five-year plan for preserving Orange County's competitive advantages, addressing the county's weaknesses, and making the most of future opportunities. As part of the five-year plan, this reports identifies census tracts and cities in the region currently underperforming economically in comparison to national averages allowing policymakers and stakeholders to create better, more effective strategies and programs aimed at improving these economically disadvantaged regions. Click here for a link to the most recent update.

- *Inside Orange County's Retail E-volution*: This special OCBC report analyzes retail in Orange County at a time when the overall U.S. retail industry is becoming increasingly disrupted by e-commerce and other new and innovative ways to shop. Retail's current transformation will effect local communities in a variety of ways from land use to income tax revenue. The report analyzes these potential impacts and identifies ways for local developers, civic planners, and other stakeholders to keep brick-and-mortal retail relevant in the e-commerce era. Click here for a link to the report.

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9th annual southern california economic summit

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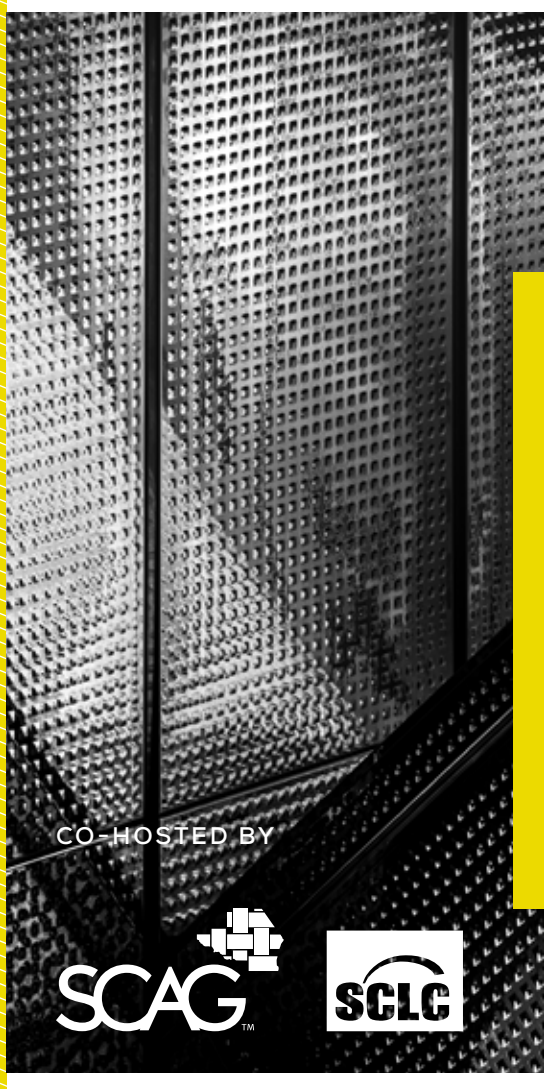

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